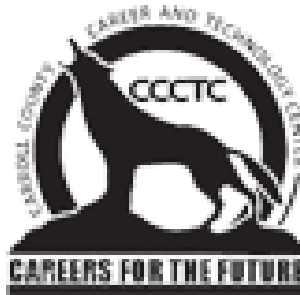


# Carroll County Career and Technology Center Applied Mechanical Engineering Program supplemental materials

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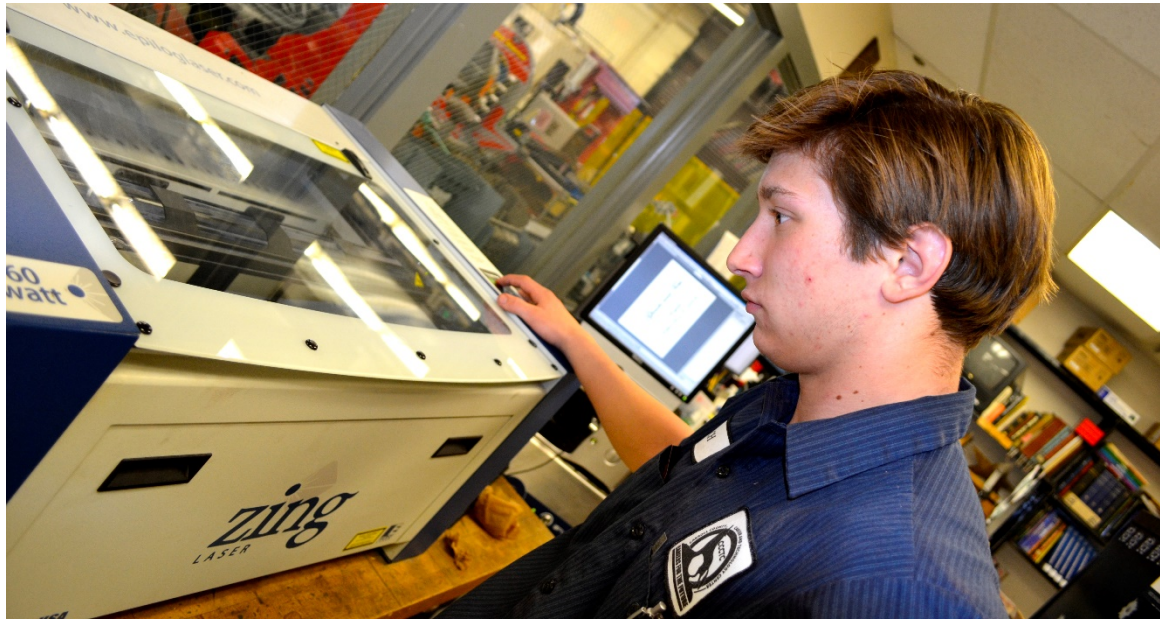




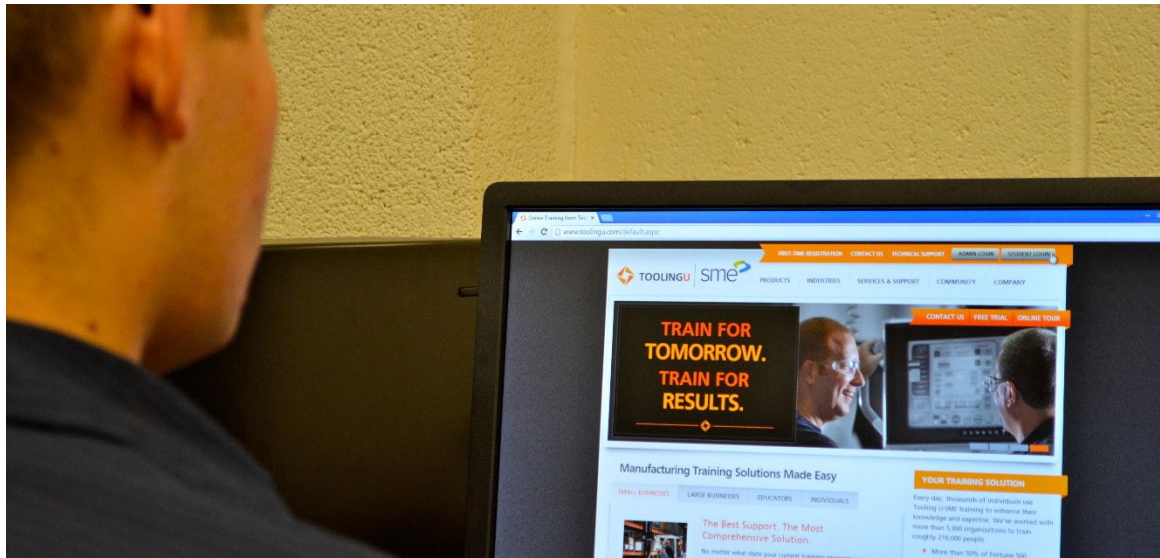








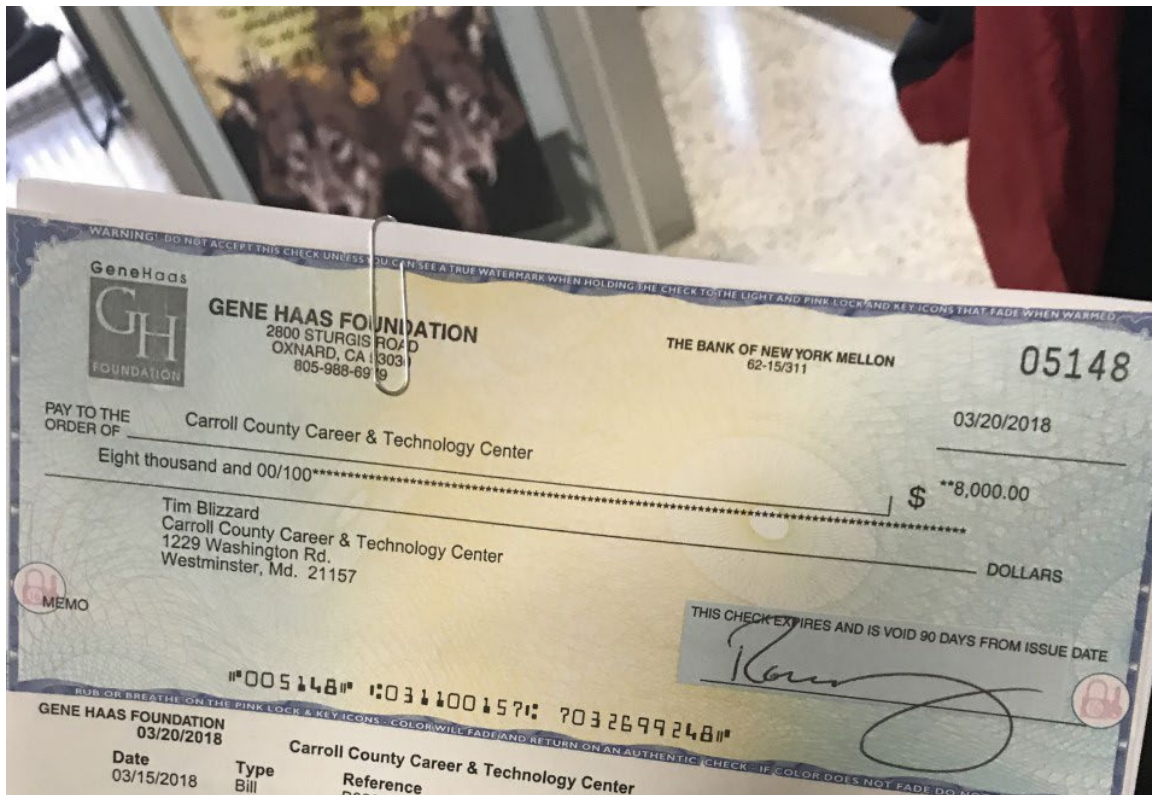












# MSDE selects Tech Center Manufacturing and Machine Technologies as program of excellence

Posted: Tuesday, April 1, 2014 7:30 pm | Updated: 11:17 pm, Tue Apr 1, 2014. By Alisha George Times Staff Writer

The Maryland State Department of Education has selected the Manufacturing and Machine Technologies Program at the Carroll County Career and Technology Center as the 2014 Career and Technology Education Outstanding Secondary CTE Program of Excellence, according to a Carroll County Public Schools news release. This award recognizes programs for adding value to the students' overall educational program as defined by contemporary economic and workforce development demands. Other criteria include student mastery of high levels of academic and technical skills; student completion of the high school curriculum; student placement and retention in further education, employment or the military; and non-traditional enrollment and completion of the program, according to the release. MMT is a rigorous, high quality Science, Technology, Engineering and Mathematics complete program that is specific to the level of knowledge and skill development demanded by local industry that includes over 70 manufacturing and machining facilities in Carroll County. The program is now available through Continuing Education and Training at Carroll Community College, providing a continuous pipeline of skilled workers in manufacturing. The students who complete this program while being prepared for post-secondary education and the local workforce are also competitive globally, according to the release. In 2012, the Manufacturing and Machine Technologies program was chosen by the U.S. Department of Education as the first location in a series of visits to showcase exemplary career programs focused on advanced manufacturing. The program had recently received National Institute of Metalworking Skills accreditation, which allows students to earn national industry certifications. The program received recognition as the first high school in Maryland to receive such accreditation in May 2011. As a result of their success, MMT teacher Tim Blizzard and five of his students gave a presentation as a model program at the 2013 Maryland State Department of Education Project Lead the Way/Career and Technology Education Counselor Conference, according to the release. This year, the Manufacturing and Machine Technologies Program volunteered to participate in High School Students United with NASA to Create Hardware, known as the HUNCH program. Students can build five sets of three parts before the end of the school year using raw materials provided by NASA. The students also receive support from the Goddard Space Flight Center in Greenbelt. The qualified parts will initially be used for astronaut training purposes, according to the release.

Reach staff writer Alisha George at 410-857-7876 or [alisha.george@carrollcountytimes.com](mailto:alisha.george@carrollcountytimes.com). Carroll County Times.



# Student machinists partner with NASA

Posted: Tuesday, March 11, 2014 6:00 am

Student machinists partner with NASA By Jon Kelvey Advocate Staff Writer

Using a computer controlled milling machine to cut the pieces for a metal locker wouldn't ordinarily be a challenge for an advanced student in the Manufacturing and Machine Technologies program at the Carroll County Career and Technology Center, but then, a locker isn't ordinarily orbiting the earth at 17,500 miles per hour. Three students in the program are currently machining parts for NASA that may one day fly on the International Space Station.

"We definitely had to go outside of our comfort zone on this to be able to perform the task because it wasn't your usual parts," said Zach Plank, one of the students working on the project. "[The locker has] got some different angles on it and stuff, things we've never had to do before."

Plank and his classmates Brooks Daniels and Walter Stathers are working on the locker as part of the NASA HUNCH program, an 11-year-old program also known as High school students United with NASA to Create Hardware, according to Rob Thate, HUNCH program manager at NASA's Goddard Space Flight Center in Greenbelt.

"The benefit is two-fold. For the students it's a great opportunity to take the skills they are learning already in the classroom and apply them to a real world project," Thate said. "We are [also] trying to inspire the next generation of scientists, technicians and engineers. One day I am going to retire and we need to pass our knowledge on to the next generation."

The Carroll County Career and Technology Center is one of only two schools in Maryland to participate in the program, according to Thate, the other being the Dr. James A. Forrest Career and Technology Center in Leonardtown.

NASA approached the Carroll County Career and Technology Center about participating in the program after noting their back to back gold metal performances in Computer Numerical Control milling at the SkillsUSA Maryland state competition, according to Tim Blizzard, the Manufacturing and Machine Technologies instructor.

"They came by the first week of school this year, back in August. They have to look at the facility to see if we even have the equipment for making their parts," Blizzard said. "It's pretty high-end stuff and a manual machine will not make it. You have to have Computer Numerical Control milling."

NASA has provided the students with high-grade aluminum alloy and the specifications for a locker, according to Blizzard. The parts start out as 10 by 18 by 2 inch thick plates that his students must then machine down to fit NASA's rigorous specifications.

"When they are finished, there are some angles and sides, but the parts will be approximately thirty-thousandths of an inch thick, to lighten it up as much as possible," Blizzard said. "I specifically gave them the parts and said, 'here you go.' I wanted to see how they would do it."

Thus far, Blizzard said, they seem on track to finish their milling by the end of the year.

The finished components will be part of a versatile locker that is common on the International Space Station and can serve as everything from a simple storage bin to the housing for scientific experiments, according to Thate. The components Blizzard's students complete this year will be installed in a mirror image of the space station at

Johnson Space Center next year, where astronauts will practice using them in water tanks to simulate working in weightlessness.

If all goes well, next year Blizzard's students could be making pieces that actually fly.

"They start out at the training level and then if the parts are of exceptional quality ... they will go through the process of qualifying the parts for spaceflight," Thate said.

Unfortunately, the three current Research and Development students in Blizzard's class will be graduating this spring so it will be the next crop of top students who will have to carry the torch all the way to space. Still, Brooks Daniels said that just being a part of the program has been a unique experience.

"To get your name on something that big is pretty important and exclusive," Daniels said. "Not many people can say they can do that."

Reach staff writer Jon Kelvey at 410-857-3317 or [jon.kelvey@theadvocateofcc.com](mailto:jon.kelvey@theadvocateofcc.com).

Carroll County Times 2014

## **Technology Center receives visit from United States Department of Education official**

As Taylor Snyder got ready for school Thursday, he didn't realize his day would include talking with an official from the United States Department of Education. Snyder, a Francis Scott Key High School senior, looked down at his T-shirt and jeans and said he didn't even prepare for the occasion.

Snyder completed the Manufacturing and Machine Technologies program at the Carroll County Career and Technology Center and earned the National Institute for Metalworking Skills certification. On Thursday, Snyder gave a tour of the program facility to Brenda Dann-Messier, Assistant Secretary in the Office of Vocational and Adult Education for the USDE. "It was a big honor," he said. "I'm really happy I was in such a good program."

The Tech Center was selected as the first stop to be visited by the Office of Vocational and Adult Education during its month-long series of visits to model programs across the country in response to President Barack Obama's call in his State of the Union address for the great investment of funds to prepare for the jobs of tomorrow.

Dann-Messier said Carroll County was recommended by the state officials because it was the first high school program in Maryland to receive accreditation from the National Institute for Metalworking Skills. The school celebrated receiving the official accreditation last year, which is on a five-year certification cycle.



The program and certification provided Snyder with training and tremendous opportunities, she said. While still attending school, Snyder works at Complex Manufacturing in Union Bridge. “He found his passion through this program,” Dann-Messier said.

Before receiving a tour, Dann-Messier facilitated a roundtable discussion with instructors, school officials, industry and National Institute for Metalworking Skills representatives.

The panel explained successes but also talked about the challenges faced when developing the program. Those at the roundtable also spoke honestly about the challenges that are expected to come as the program adapts to changing industry needs. When forming federal policy, it’s important to know what’s happening on the ground level, Dann-Messier said.

Panelists spoke about parent reluctance about their students taking the program, the importance of leadership and industry connections, and the necessity to train teachers in the field to ensure program strength and future certainty.

In the afternoon, Dann-Messier held a parent and student roundtable discussion about the industry. It’s important that parents are informed about the opportunities available in Manufacturing and Machine Technologies and learn that it is not a dead-end field, she said. She has heard stories about how students had to fight their parents about the applicability of learning these skills.

“Parents may not know how the workforce has changed,” Dann-Messier said.

The program is helping students prepare for both college and careers, she said.

“This isn’t the end for them,” she said.

The Tech Center helps to prepare students for the careers that they can currently obtain in the field, which are mostly located in small shops and require knowledge in multiple skills, Tech Center principal Bill Eckles said. Many jobs in mass manufacturing do not exist anymore in the country, he said.

“It’s more than just knowing what button on the machines to push,” Eckles said.

Students are taught operation and programming of computer numerical control equipment, blueprint reading, lathe and grinding operations, milling machine operations and drill press operations.

Opportunities to collaborate with those in the engineering program allow students to speak intelligently with designers about the feasibility of creating their ideas. Students are taught how and when to use different materials as well, he said.

It is an honor that the Tech Center was singled out as a place worth visiting, which is a testament to the dedicated instructors and business partners, Eckles said.

“It’s great that we are seen as having a highly successful program and that we can be a model for others,” he said.

Reach staff writer Alisha George at 410-857-7876 or [alisha.george@carrollcountytimes.com](mailto:alisha.george@carrollcountytimes.com).



KEN KOONS/STAFF PHOTO

## Special visitor

Brenda Dann-Messier, Assistant Secretary for the United States Department of Education's Office of Vocational and Adult Education, visits the Career and Technology Center in Westminster Thursday.





KEN KOONS/STAFF PHOTO

## Taking a tour

Student Taylor Snyder talks with Brenda Dann-Messier, Assistant Secretary for the United States Department of Education's Office of Vocational and Adult Education at the Career and Technology Center in Westminster Thursday.

## Officially Accredited: Carroll Co. Career & Technology Center

<https://nims-skills.org/> May 2011

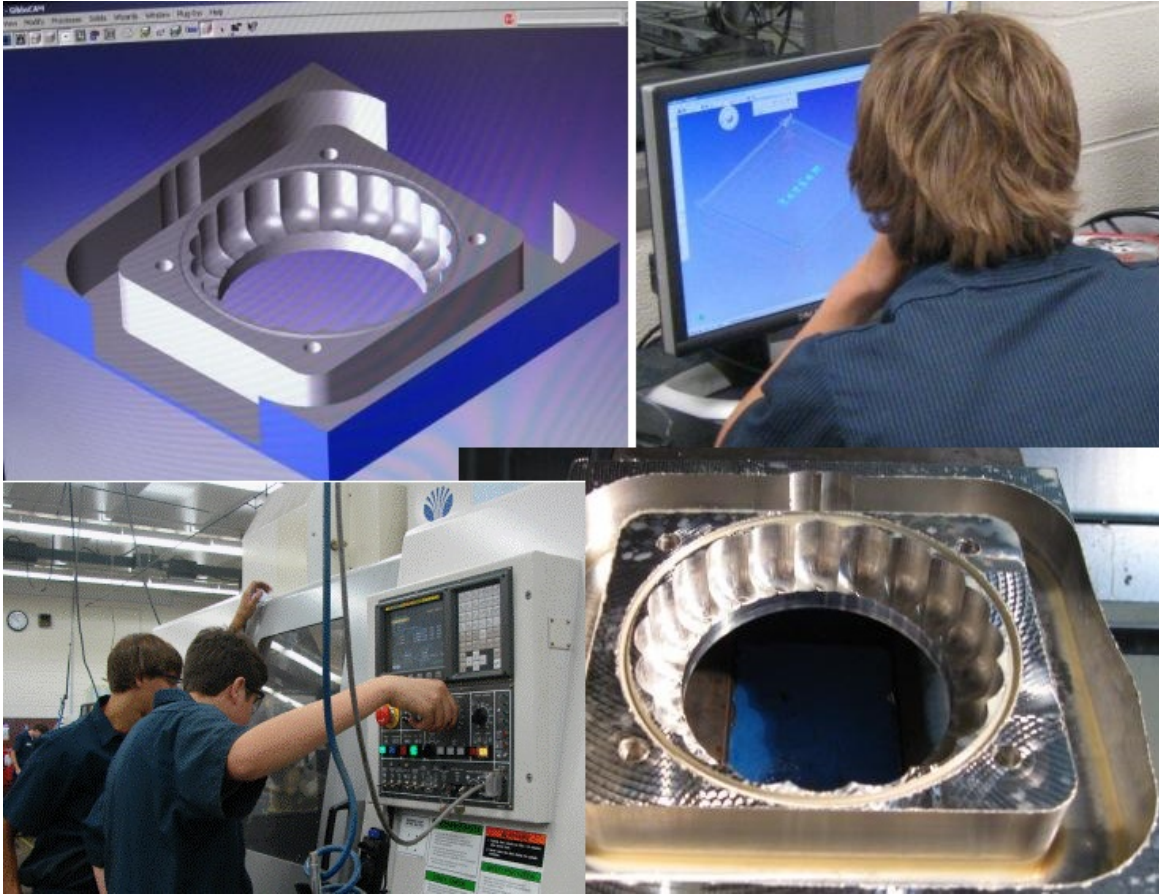
NIMS is pleased to announce the official accreditation of the Manufacturing & Machine Technologies Program at the Carroll County Career & Technology Center in Westminster, Maryland! Since first applying for accreditation in March 2009, the staff and faculty at Carroll Co. CTC have aligned their training program with industry standards, giving their students the tools they need to establish successful careers in the nation's industry. **What makes this even more special, is that this is the first secondary program in the entire state of Maryland to complete the accreditation process and earn the formal accreditation!**

To complete the accreditation process, an On-Site Evaluation took place on May 5th and 6th of this year. The Evaluation Team was made up of:

- Industry Representative Montez King of the Magna Baltimore Technical Training Center in Baltimore, MD.
  - Education Representative Cole Walker of Manchester Valley High School in Manchester, MD.
- Following the two-day audit, the Evaluation Team voted unanimously to accredit the program. The following remarks were made in the post-evaluation report:

- The purpose of the program aligns very well with industry needs.
- Regarding equipment, tooling, and measuring devices, the program has an adequate supply thanks to local employers providing items upon request. The team also noted that these same employers are actively contacting the program to fill employee shortages.
- The Career Center's administration strongly supports the program and understands the role it serves in the local economy.

Congratulations to everyone involved in this process, especially Principal Kate Engel, Assistant Supervisor for Career & Technical Education Ted McNett, and Instructor Tim Blizzard for all their efforts to earn this accreditation. Special thanks go to the evaluation team as well, without whom this would not have been possible: Greg Chambers, Montez King, and Cole Walker.



### **U.S. Department of Education Visits NIMS-Accredited Carroll Co. Career & Technology Center**

In response to the President's call in his State of the Union address for a greater investment of funds to "prepare for jobs of tomorrow," the Department of Education's Office of Vocational and Adult Education (OVAE) is embarking on a month-long series of visits to model programs across the country. Carroll County Public Schools was chosen as the first stop in the series of visits to showcase exemplary career programs focused on advanced manufacturing and the Manufacturing and Machine Technologies (MMT) program at Carroll County Career and Technology Center (CCCTC) was selected as a result of having recently received NIMS Accreditation. Brenda Dann-Messier, United States Department of Education's Assistant Secretary for the OVAE, and Deputy Assistant Secretary Johan Uvin were joined by several key policy staffers from the Department, as well as numerous State and local officials





including Assistant State Superintendent Katharine Oliver and Superintendent of Carroll County Schools, Stephen Guthrie.

NIMS Interim Director James Wall and Director of Accreditation Catherine Ross were in attendance, with Mr. Wall contributing to the event as a panelist in a roundtable discussion that was facilitated by Assistant Secretary Dann-Messier and

Deputy Assistant Secretary Uvin. The panel shared insight on the types of practices that are ensure high quality career programs in advanced manufacturing. The Assistant Secretary's questions highlighted the need for national industry certifications and she showed very strong support for the NIMS mission. Several other local industry people echoed the importance of our certifications.

Following this discussion, attendees were invited to take a student-led tour, in which attendees could learn about the equipment and their processes from students that are currently enrolled in classes at the Center. Among those students was a recent graduate of the program, who emphasized that having earned NIMS Credentials led directly to his being hired by General Dynamics.

[VIEW A WBAL-TV VIDEO OF THE FACILITY TOUR](#)

Attendees then convened for a second roundtable discussion, this time highlighting the perspectives and experiences of current students, their parents, and of recent graduates. These panel members voiced their support for career-technical education and noted that the program met students' needs for applied learning in a highly technical, hands-on environment. Students included on this panel ranged from first- or second-year students, to one who had only been in the program for a week, but was already convinced that he had made the right choice for pursuing his long-term career goals.

[VIEW PHOTOS OF THE EVENT ON THE NIMS FACEBOOK PAGE](#)

Panel #1 Included:



- -Tim Blizzard, Instructor, Manufacturing & Machine Technologies, CCCTC
- -Bill Eckles, Principal, CCCTC
- -Kathy Hunter, Western Electric
- -Judy Loar, Principal Investigator, The TIME Center at the Community College of Baltimore County (CCBC)
- -Marjorie Lohnes, Supervisor of Career & Technology Education, CCCTC
- -Jess Parry, Ridge Engineering
- -Mike Raab, AB Technologies
- -James Wall, Interim Director, NIMS
- -Bill Werneke, Instrucor, Manufacturing Technology Center, CCBC

Panel #2 Included:

- -Brandon Barnes, Research & Development student in MMT Program
- -Kevin Barnes, Father of Brandon Barnes
- -Mark Leister, student at Manchester Valley High School & MMT Program completer
- -Mr. & Mrs. Leister, Parents of Mark Leister
- -Sharon Miller, USDE Director, Division of Academic & Technical Education, OVAE
- -Mark Osterhouse, student at CCCTC & Francis Scott Key High School
- -Kevin Seibel, 2011 CCPS & MMT Graduate, currently employed at General Dynamics in Westminster, MD
- -Taylor Snyder, Francis Scott Key High School student, MMT Program completer, & student intern at CCCTC

[Click for more on the Manufacturing & Machine Technologies Program at Carroll County Career & Technology Center.](#)

Click for more information on [NIMS Credentials](#) or [NIMS Accreditation](#) opportunities at your program



# Tech Center partners with NASA to make parts for astronauts



DYLAN SLAGLE/STAFF PHOTO

## In the machine shop

Manufacturing and Machine Technologies instructor Tim Blizzard, second from left, shows NASA visitors Todd Purser, Rob Thate and Stacy Hale around the machine shop at Carroll County Career and Tech Center in Westminster while senior Zach Wilhelm, left, works on a project Thursday.

Posted: Friday, November 15, 2013 12:15 am | Updated: 12:17 am, Fri Nov 15, 2013.

**Tech Center partners with NASA to make parts for astronauts** By Alisha George Times Staff Writer

It hasn't set in yet with Brooks Daniels that he will be making parts for astronauts.

As of Thursday, the Manchester Valley High School senior is the only student in his Carroll County Career and Technology Center's Manufacturing and Machine Technologies course to take on the challenge.

## High School Student to Machine Parts for NASA

by [Christian Bonawandt](#) | November 19, 2013 | [Leave a Comment](#) | [Print](#)

A high school student in Manchester, Md., has taken on the challenge of machining parts for NASA.

Brooks Daniels, who takes a course at the Carroll County Career and Technology Center, volunteered to participate in the High School Students United with NASA to Create Hardware (HUNCH) program. Students enrolled in the Manufacturing and Machine Technologies course at the center are eligible for the program and make the NASA parts on top of their normal workload.

Daniels, a senior at Manchester Valley High School, is the only student in the course to accept the challenge. "The more you push yourself, the better you get," he told the [Carroll County Times](#). "That opens a lot of doors."

Daniels and other students enrolled in courses affiliated with HUNCH will build five sets of three parts before the end of the school year using raw materials provided by NASA, according to Stacy Hale, program manager for HUNCH at the Johnson Space Center in Houston.

HUNCH works with different schools across the nation and recently expanded to Maryland, New York, Connecticut, Massachusetts, and New Hampshire — states supported by the Goddard Space Flight Center in Greenbelt, Md.

Hale told the Carroll County Times that the parts will initially be used for astronaut training purposes. As students become more proficient, they will begin to create Class 1 flight hardware that could fly on NASA spacecrafts.

Though Daniels is the only student to take on the task at his high school, four other students in his class have expressed interest.

Valerie Bortz, assistant principal of the Tech Center, said HUNCH work fits well into the curriculum. "It will give the students an extra sense of purpose," she said. "It is relevance at a whole new level."

VIDEO

<http://www.schooltube.com/video/f9d7787c214e460484f5/Program%20Highlight%20-%20Manufacturing%20&%20Machining%20Technology>

# High Tech Career Program Gets National Attention

## *Carroll County Career And Technology Center Prepares Students For Jobs*

UPDATED 4:45 AM EST Feb 09, 2012

CARROLL COUNTY, Md. —A Carroll County high tech career program is turning heads in Washington and, according to 11 News education reporter Tim Tooten, has become a sort of national model.

Tooten said it's a program where students combine book knowledge with hands-on skills on their way to landing a job. He added that what used to be called "vo-tech" has received a makeover and has become the type of program that could help stimulate the ailing economy.

Students at the Carroll County Career and Technology Center gave top federal education officials a crash course Thursday in manufacturing and machine technology.

A top U.S. education official for vocational and adult education led a tour of the center and was impressed by what she learned.

"We need to make sure that we are working with industry so that we are responsive to the needs of industry," said Brenda Dan-Messier, assistant U.S. education secretary. "Because this is what's available in the workplace, and you have to have the same equipment in schools that you are going to find in the workplace."

The Carroll County program has gotten high marks as the first high school to receive accreditation from the National Institute of Metalworking Skills.

"Programs are nationally certified, students are earning those national credentials," said Kathy Oliver of the Maryland State Department of Education.

Students are landing top manufacturing jobs after graduation.



"I came right out of here, went right into industry, and I've been working in industry for over a year now," said former student Kevin Seible. "And I love what I do."

That's what school officials have in mind, from the time students show up to their first class.

"College and career ready is really where we want to be in Carroll County, and really in public education across Maryland," said Carroll County Superintendent Stephen Guthrie. "And it's what we are doing here in Carroll County to give students options that fit their interests, their desires and future careers."

Thursday's Carroll County tour is one in a series of nationwide visits to look at model education programs, Tooten said.

Read more: <http://www.wbaltv.com/High-Tech-Career-Program-Gets-National-Attention/11033536#ixzz2t21XOhqH>  
<http://www.aerospacemanufacturingengineer.com/amd-0911-helping-others-help-themselves.aspx>

## Helping Others Help Themselves

Matt Grasson SEPTEMBER 2011

*Several students verify their work in front of a Doosan Lynx 200LM at Symbol Job Training Inc., Skokie, IL.* In today's world of high unemployment and under-qualified employees, Doosan Machine Tools is working with many different educational facilities to help train those people who desire a career as a skilled laborer.



Symbol Job Training Inc., a Chicago, IL-based educational organization, works on building partnerships between businesses and students while providing education and hands-on training in programming, setup, and operation of computerized numerical control (CNC) machines.

In order to provide these students with the education that they need, Symbol Job Training's Director of Business Operations, Tom Peters, decided to work with Dave Fahlgren of 520 Machinery, an exclusive distributor of Doosan machine tools.

When asked why he decided to go with Doosan machines, Peters states, "As a learning institution that prides itself on real world hands-on training, we find it essential that our students train on machines that they will experience on the shopfloor. It is a great introduction to the real world and a lifelong career as a machinist."

Peters also comments on the additional training provided by Doosan saying, "Doosan has helped train our instructors with specialized assistance through their own trainers."

*Akron CNC Training Center Doosan MV3016LD* Another institution that found great success with Doosan is Akron CNC Training Center, Akron, OH. Laurie Norval, director of the state-approved training center, found that the Doosan equipment has served their training center and students very well since the purchase of their DNM400 and Lynx 200 for their training facility. The centers instructors are well-qualified machine operators and programmers who combine their experience and knowledge with a desire to teach. This combination provides the



instructors with the machine tools to educate those who desire a career in manufacturing.

Norval explains, "This is a hands-on skilled trade. It is imperative that students learn to run equipment found in the workplaces where they will land a job. The up-to-date technology is definitely a bonus for the students learning experience."

Tim Blizzard, manufacturing and machine technologies teacher at Westminster, MD-based Carroll County Career & Technology Center's worked with Michael DeMarti from MDMachinery in a recent purchase of four Doosan machine tools (one DMV 3016 and three MV 3016LD's). According to Blizzard, this purchase helped make them the first NIMS accredited school in the state of Maryland. "Doosan representatives from MDMachinery worked closely with our MET-TEC committee to help in purchasing the correct equipment, as well as helping to assure the accreditation," Blizzard states.

However, Blizzard comments that the reason they chose Doosan machine tools was that they were looking for a machine that was current with industry standards, needed little maintenance, is extremely reliable, and was bulletproof for students with absolutely no machining experience.

*With the help of Doosan, Carroll County Career & Technology Center's Manufacturing & Machine Technologies class received the NIMS accreditation in June 2011.*

With students working in all types of shops – doing everything from machine operator to actually programming and setting up their own machines – Blizzard wanted to make sure that his students were prepared for their life in manufacturing. Many of Blizzards former students, who trained on Doosan machine tools, manufacture parts for companies such as NASA, Northrop Grumman, General Dynamics, and The Department of Defense.



When asked about the importance of training on Doosan machine tools, Blizzard spoke about one student in particular that works for a company just north of Baltimore: "He started doing his own programming and setups within a few months of gaining employment with a company that works with many different types of exotic materials."

He recently informed Blizzard that he never knew he would learn so much in such a short period of time, saying that, "Working on the Doosan's at school made me very comfortable with the machines and controls at my new job."

Asking Jim Shiner, director of sales and marketing, Doosan, about Doosan's beliefs in supporting our educational systems garners pride. "We have a special school incentive program that allows our distributors to place machines into public education institutions. We feel it is our duty and responsibility to do everything possible to facilitate the education of tomorrow's workforce today," Shiner explains. "Even with the current high unemployment rate in the United States, there is still a shortage of skilled machine operators. We need and want to get students in front of high technology equipment, show them that there are opportunities out there, and demonstrate that operating a CNC machine tool is not the old 'get your hands dirty' job; it is a highly skilled technical job."

Even with the current unemployment rate at 9.1%, many companies are stating that they are unable to find qualified employees. However, with the help and support of



companies, such as the lead Doosan is taking, those companies should start to see an influx of qualified employees.

Doosan Machine Tools  
Pine Brook, NJ  
[infracoremt.com](http://infracoremt.com)

Akron CNC Training Center  
Akron, OH  
[akroncnc.com](http://akroncnc.com)

Symbol Job Training Inc.  
Skokie, IL  
[symboljobtraining.com](http://symboljobtraining.com)

Carroll County Career & Technology Center  
Westminster, MD  
[maryland.schooltree.org/public/Carroll-County-Career-Technology-Center-038406.html](http://maryland.schooltree.org/public/Carroll-County-Career-Technology-Center-038406.html)

## Company Profile



What began as an engineering services provider in the basement of a home is now a manufacturer of a full line of liquid packaging machinery. **intelliTECH** product development has been a combination of expertise and customer's need. Intellitech produces custom fill and finish machinery that delivers precision results for regulated filling environments. **With proven experience in the design and integration of automation, robotics and electrical controls our products are satisfying customers through their ease of use and reliable performance for the biotech, pharmaceutical and specialty chemical industries.** Innovative thinking and the passion **intelliTECH** has for each and every one of its customers fuels company growth.

Products include the modular **i-FILL®** family of precision pumps (available with single-use fluid path), **i-CAP®** package closure systems, the **intelliFILLER™** line of liquid fill/finish solutions and **intelliFLEX** conveyors for the bio-tech, pharmaceutical and specialty chemical industries.

### Community Involvement

**intelliTECH** is not only a company focused on pleasing our customers, we also are committed to promoting educational opportunities and economic growth in our community through some of the

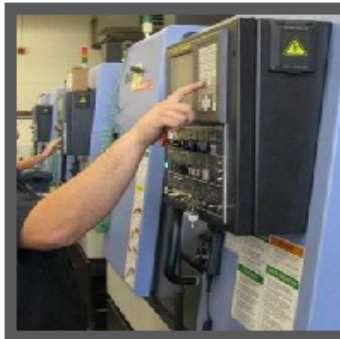
following activities. We believe that being involved in the community promotes the development of technology and increases awareness of the benefits of technology.

- Created 22 intern positions through the Carroll County Career & Technology Center, Project Lead the Way and York College Engineering Program.
- Donated supplies & training materials to the Carroll County Career & Technology Center's Engineering (Project Lead The Way) & Machine Technology programs
- Participated in Academy Career Speakers Day for the Carroll County Public School System
- Contributed to Carroll Community College, Innovative Partnerships for Technology Program
- Serve on local non-profit Boards and Commissions, e.g.; Carroll Community College, Carroll Technology Council and Carroll County Economic Development Commission.
- Participated in Maryland Business Roundtable Speaker's Program "Achievement Counts"

But enough about us, it's really about **You**.

Program facilitated and extended to CCC adult education





**CCCTC  
WEBSITE  
PREVIEW**

**Applied  
Mechanical Engineering**



Applied Mechanical Engineering is an excellent program for aspiring Mechanical Engineers to see how metal parts are made with precise tolerances. It allows them an opportunity to see where engineering theory meets the reality of production. This program can also prepare students for beginning a career as a machinist, a production operator, a quality control technician, or a manufacturing engineering technician in the computer-enhanced manufacturing environment. The program focuses on hands-on experiences using industrial tools such as lathes and mills. It also teaches students how to run highly advanced computer numerically controlled (CNC) equipment along with 3D imaging software (CAD CAM) to make precision parts. This program has earned national certification through the National Institute of Metalworking Skills (NIMS).

**COLLEGE CREDITS AND CERTIFICATIONS:**

- Earn articulated college credits through Penn College of Technology or The Community College of Baltimore County
- Take the NIMS certification tests in: Measurement, Materials and Safety and/or Job Planning, Bench Work and Layout. Other tests are optional for qualified students.



**MAJOR UNITS OF STUDY:**

- Bench Work
- Metal Fabrication
- Blueprints
- Drill Press Operations
- Grinding Operations
- Hand Tools
- Heat Treatment Operations
- Lathe Operations
- Milling Machine Operations
- Precision Measuring Tools
- Program and Operate CNC Equipment
- Sawing Operations
- Technical Math

**PROFESSIONAL AFFILIATIONS:**

- National Institute of Metal Working Skills (NIMS)



**SCHEDULE:**

M&MT I (3 credits) Spring of junior year  
M&MT II (3 credits) Fall of senior year

Want to know more? Check out our website at:

**[www.carrollk12.org/ctc](http://www.carrollk12.org/ctc)**

*"Meet the Instructor"*

**College & Career Opportunities**

[Watch Program Video](#)

[View Pictures](#)

**Notice of Non-Discrimination:** The Carroll County Public Schools (CCPS) is firmly committed to creating equal employment and educational opportunities for all persons with regard to its employment practices and in the provision of services, programs, and activities. The CCPS does not discriminate on the basis of age, color, genetic information, marital status, race or physical disability, ancestry or national origin, sex, religion, sex, or sexual orientation. The CCPS provides non-discriminatory access to school facilities in accordance with its policies and regulations regarding the appropriate use of schools (including, but not limited to, the Boy Scouts). The following person has been designated to handle inquiries regarding the non-discrimination policies: Gregory J. Rizzo, Director of Research and Accountability, 125 North Court Street, Westminster, Maryland 21157, 410-951-6668

**Carroll County Career and Technology Center**  
**Applied Mechanical Engineering I & II**  
**Program of Study**

**Program Title:**

Applied Mechanical Engineering

**Program Description:**

This program prepares students for a beginning career as a machinist, production operator, quality control technician, or manufacturing engineering technologist in the computer-enhanced manufacturing environment. The program focuses heavily on hands-on experiences using industrial tools and advanced computer numerically controlled (CNC) equipment. Machinists use their knowledge and understanding of metals and their skills with tools to design, plan, and carry out the processes needed to make products with precise specifications. An engineering technologist works closely with engineers to design, develop, and test industrial and consumer products by applying mathematics and science. Students will learn about workplace safety, teamwork, metallurgy, computer aided manufacturing software, robotics, control systems, project management, fabrication, lean manufacturing, and quality assurance. Throughout the course, students will work toward specific certifications from the National Institute of Metalworking Skills (NIMS).

**Program Length:**

6 credits

180 days x 5 hours = 900 instructional hours

**Program Goal:**

This course is designed to provide students with the necessary environment and interactions to be a productive member in a manufacturing environment as a machinist, production operator, quality control technician, or manufacturing engineering technologist.

**Applied Mechanical Engineering I**

**Course Description:**

This course is designed to provide students with the necessary environment and interactions to be a productive member in a manufacturing environment as a machinist, production operator, quality control technician, or manufacturing engineering technologist. This course includes in-class activities and lab activities. In-class activities include lectures, discussions, student presentations, and research. Lab activities include completing designated procedures by working in teams with CNC machines, computers, and industrial tools. During lab/shop activities students will apply knowledge obtained from in-class discussions and readings to further advance their understanding of Applied Mechanical Engineering. A student who receives National Institute of Metalworking Skills (NIMS) Machining Level I credentials is a skilled machine operator or technician who has demonstrated competence in three major areas of responsibility; basic bench operations, basic metal cutting operations, and basic inspection and quality assurance functions. Industry professionals provide in-class mentoring working individually with the students to provide real life applications. Students will develop individualized training plans and include participation in work based learning experiences, as appropriate, through Career Connections. Every student will use and maintain a "Skills for Success" portfolio. This portfolio development is integrated into the curriculum and used at the annual Mock Job Interviews.



**Course Objectives:**

Upon completion of this course, students will be able to:

- Demonstrate knowledge of basic safety, cutting tool safety and basic machine maintenance and housekeeping.
- Use and interpret basic measuring instruments, resolution, and applicability of basic measuring tools for given situations.
- Demonstrate basic types of tooling materials, applications of tooling and processes for drilling, milling, sawing, turning, and proper procedures using hand tools.
- Demonstrate an understanding of basic and precision layout equipment and procedures. The student should have a basic knowledge of print reading and orthographic projection.
- Demonstrate the ability to read basic part prints and/or technical drawings (blueprints) and understand basic dimensioning tolerances.
- Apply basic math knowledge from whole number computations and algebra to basic geometry including the application of formulas involving tapping, tapers speeds and feeds, and threading.
- Recognize appropriate codes of conduct in the workplace and has exhibited honesty, integrity, and responsibility in communication, training and work.

**Evaluation:**

Students are expected to complete assessments based on NIMS standards in the following areas:

- NIMS Machining Level I - Measurement, Materials and Safety
  - Measurement, Materials and Safety Credentialing required for Manufacturing and Machine Technologies II
  - Student must pay NIMS fee for any required re-testing
- NIMS Machining Level I - Job Planning, Benchwork, and Layout

**Optional for qualified students:**

- NIMS Machining Level I - Manual Milling
- NIMS Machining Level I - Manual Turning with Chucking

The assessments are standards based drawn from the industry validated metalworking standards. Both performance and theory assessments are developed by the industry and piloted in the industry. The NIMS credentials are awarded on satisfactory completion of both performance tests and related theory exams. The performance assessment projects are inspected by local industry professionals. All the projects are inspected for accuracy and tolerance to meet the specifications of the provided project drawings and a performance affidavit is completed by the inspector. When successfully inspected the performance affidavit is sent to NIMS for credentialing.

**Applied Mechanical Engineering II**

**Prerequisites:** NIMS Measurement, Materials and Safety Credential

**Course Description:**

This course prepares students for a beginning career as a machinist, production operator, quality control technician, or manufacturing engineering technologist in the computer-enhanced manufacturing environment. The course includes classroom activities and hands-on experiences using industrial tools and advanced computer numerically controlled (CNC) equipment. Students carry out the processes needed to make products with precise specifications. Students will learn about workplace safety, teamwork, metallurgy, computer aided manufacturing software, control systems, project management, fabrication, lean manufacturing, and quality assurance. Throughout the course, students will work toward specific credentials from the National Institute of Metalworking Skills (NIMS). Industry professionals provide in-class mentoring working individually with the students to provide real life applications. Students will develop individualized training plans and include participation in work based learning experiences, as appropriate, through Career Connections. Every student will use and maintain a “Skills for Success” portfolio. This portfolio development is integrated into the curriculum and used at the annual Mock Job Interviews.

**Course Objectives:**

Upon completion of this course, students will be able to:

- Work cooperatively with others and contribute to work efforts with ideas, suggestions, and feedback to improve the process, resolve a problem or improvise a new method.
- Follow basic quality assurance responsibilities for both single and multiple part production including statistical process control.
- Be competent in all safety procedures for all machining operations and material handling and disposal within their responsibility.
- Perform basic process planning, setup, and operation of common classes of machine tools such as turning, milling, drilling, or surface grinding machines.
- Read and comprehend information on orthographic prints and job process sheets for routine manufacturing operations.
- Setup and operate vertical milling machines and identify essential components, their functions and basic machine adjustments.
- Setup and carry out chucking operations for turning and identify essential components, their functions and basic machine adjustments.

**Optional for qualified students:**

- Manual Turning Between Centers
  - Setup and carry out between centers turning operations for straight turning
- Manual Surface Grinding
  - Setup and operate manual surface grinders
  - Perform routine surface grinding, location of surfaces, and squaring of surfaces
  - Perform wheel dressing and testing.
- Manual Drill Press Operations
  - Setup and operate drill presses and perform routine drill press operations.
- CNC Turning: Programming Setup & Operations
  - Use the principles of Cartesian coordinates to develop a program for the manufacture of a simple part.
  - CNC Milling: Programming Setup & Operations
  - Apply the principles of three-dimensional coordinate planes in the development a simple program for the production of the part on a CNC milling machine.

**Evaluation:**

Students are expected to complete assessments based on NIMS standards in the following areas:

- NIMS Machining Level I - Manual Milling
- NIMS Machining Level I - Manual Turning with Chucking

**Optional for qualified students:**

- NIMS Machining Level I - Manual Turning Between Centers
- NIMS Machining Level I - Manual Surface Grinding
- NIMS Machining Level I - Manual Drill Press Operations
- NIMS Machining Level I - CNC Turning: Programming Setup & Operations
- NIMS Machining Level I - CNC Milling: Programming Setup & Operations

**Competencies/Skills/ Industry Recognized Credentialing**

<b>National Institute for Metalworking Skills (NIMS)</b>	
Measurement, Materials, and Safety Job	Manual Surface Grinding
Planning, Benchwork, and Layout	Manual Drill Press Operations
Manual Milling	CNC Turning: Programming Setup and Operations
Manual Turning Between Centers	CNC Milling: Programming Setup and Operations
Manual Turning with Chucking	

**Program Delivery Method:**

This course includes in-class activities and lab/shop activities. In-class activities include lectures, discussions, student presentations, and research. Lab/shop activities include completing designated procedures by working in teams with CNC machines, computers, and industrial tools. During lab/shop activities you will apply knowledge obtained from in-class discussions and readings to further advance your understanding of automated manufacturing and machine technology.

**Program Evaluation:**

You will be evaluated on the achievement of the tasks/skills as listed on the competency profile, lab activity participation, daily reflection logs, and exams.

*Grade Distribution/Weight*

25% Competency Profile

25% Lab Activities

25% Daily Reflection Logs

25% Exams (Written and Practical)

**Textbook:**

[Machinery's Handbook 30th Edition Toolbox](#)

By: Oberg, Jones, Ryffel, McCauley, Heald and Hussain

ISBN: 978-083113091-6

**Supplemental Resources:**

National Institute for Metalworking Skills – NIMS – [www.nims-skills.org](http://www.nims-skills.org)

ToolingU – [www.toolingu.com](http://www.toolingu.com)

**Safety:**

It is essential that each student follow all safety guidelines, rules, and procedures as discussed in class and demonstrated in the lab/shop. Safety glasses are required for all lab activities. Ear protection is mandatory if the environment exceeds 85 decibels or manufacturing produces extremely high frequencies. A decibel meter will be used to check acceptable decibel levels.

<b>Major Units of Study</b>	
<b>Applied Mechanical Engineering I</b>	<b>Applied Mechanical Engineering II</b>
Safety	Quality
Measurement	Lean Manufacturing
Math	Continuous Improvement
Materials	Teamwork
Manual Tools and Machines	Design and Build
CNC Machines	Internships/Work-Based Learning
CAM	
Individual Skills	



### 3 credits – Applied Mechanical Engineering I - 18 Weeks

<i>Week/ Hours</i>	<i>Topic</i>	<i>Resources/Assignments/ Lab Work/Assessments</i>
Week 1 25 hrs	Introduction to the Class and Course Syllabus ~ 1.0 hr Tour of Area ~ 1.0 hr ToolingU Lessons Intro to OSHA 100 ~ 1.5 hrs Personal Protection Equipment 120 ~ 1.5 hrs Machine Guarding 140 ~ 1.5 hrs Metalworking Fluid Safety 165 ~ 1.5 hrs Noise Reduction and Hearing Conservation 170 ~ 1.5 hrs NIMS Module 1: Identify and Demonstrate Usage of Machine Safety and Personal Protective Equipment (PPE) NIMS Module 2: Demonstrate Compliance with Lock-out/Tag-out Procedures and OSHA Requirements and Guidelines NIMS Module 3: Hazardous Materials (HAZMAT) Handling and Storage Including Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) NIMS Module 23: General Housekeeping and Maintenance NIMS Module 24: Preventative Maintenance: Machine Tools NIMS Module 25: Tooling Maintenance Lab Experiences and Demonstrations ~ 13.0 hrs	ToolingU: Fire Safety & Prevention 110 Personal Protective Equipment 120 Safety for Lifting Devices 135 Safety for Metal Cutting 115 Metalworking Fluid Safety 165  Competency Profile Daily Reflection Log NIMS Measurement, Materials, and Safety
Week 2 25 hrs	ToolingU Lessons Basic Measurement 110 ~ 1.5 hrs Linear Instrument Characteristics 115 ~ 1.5 hrs Basics of the CMM 120 ~ 1.5 hrs Basics of the Optical Comparator 130 ~ 1.5 hrs Surface Measurement 140 ~ 1.5 hrs Overview of Threads 150 ~ 1.5 hrs NIMS Module 1: Identify and Demonstrate Usage of Machine Safety and Personal Protective Equipment (PPE) NIMS Module 2: Demonstrate Compliance with Lock-out/Tag-out Procedures and OSHA Requirements and Guidelines NIMS Module 3: Hazardous Materials (HAZMAT) Handling and Storage Including Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) NIMS Module 23: General Housekeeping and Maintenance NIMS Module 24: Preventative Maintenance: Machine Tools NIMS Module 25: Tooling Maintenance Lab Experiences and Demonstrations ~ 13.0 hrs	ToolingU: MSDS & Hazard Communication 160 Intro to OSHA 100 Math: Fractions & Decimals 105 Basic Measurement 110 Geometry Triangles 165 Lubricant Fundamentals 130  Competency Profile Daily Reflection Log NIMS Measurement, Materials, and Safety
Week 2 continued	ToolingU Lessons Math: Fundamentals 100 ~ 1.5 hrs Math: Fractions and Decimals 105 ~ 1.5 hrs Math: Units of Measurement 115 ~ 1.5 hrs Basics of Tolerance 120 ~ 1.5 hrs Blueprint Reading 130 ~ 1.5 hrs Geometry: Lines and Angles 155 ~ 1.5 hrs Geometry: Triangles 165 ~ 1.5 hrs Shop Geometry Overview 170 ~ 1.5 hrs Geometry: Circles and Polygons 185 ~ 1.5 hrs	ToolingU: Competency Profile Daily Reflection Log NIMS Measurement, Materials, and Safety NIMS Job Duty 2.1 Benchwork NIMS Job Duty 2.2 Manual Operations, Layout Tool Bit Grinding (HSS) Hammer Blueprint
Week 3 25 hrs	ToolingU Lessons Math: Fundamentals 100 ~ 1.5 hrs Math: Fractions and Decimals 105 ~ 1.5 hrs Math: Units of Measurement 115 ~ 1.5 hrs Basics of Tolerance 120 ~ 1.5 hrs Blueprint Reading 130 ~ 1.5 hrs Geometry: Lines and Angles 155 ~ 1.5 hrs Geometry: Triangles 165 ~ 1.5 hrs Shop Geometry Overview 170 ~ 1.5 hrs Geometry: Circles and Polygons 185 ~ 1.5 hrs	ToolingU: Competency Profile Daily Reflection Log NIMS Measurement, Materials, and Safety NIMS Job Duty 2.1 Benchwork NIMS Job Duty 2.2 Manual Operations, Layout Tool Bit Grinding (HSS) Hammer Blueprint

	<p>NIMS Module 4: Part Inspection  NIMS Module 5 and 6: Process Control and Process Adjustment  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 8.5 hrs</p>	
<p>Week 4  25 hrs</p>	<p>ToolingU Lessons  Shop Alegebra Overview 200 ~ 1.5 hrs  Trig: Pythagorean Theorem 205 ~ 1.5 hrs  Shop Trig Overview 210 ~ 1.5 hrs  Trig: Sine, Cosine, and Tangent 215 ~ 1.5 hrs  Interpreting Blueprints 230 ~ 1.5 hrs  NIMS Module 4: Part Inspection  NIMS Module 5 and 6: Process Control and Process Adjustment  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 14.5 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Measurement, Materials, and Safety  NIMS Job Duty 2.1 Benchwork  NIMS Job Duty 2.2 Manual Operations, Layout  Hammer</p>
<p>Week 4  continued</p>	<p>ToolingU Lessons  Intro to Materials 100 ~ 1.5 hrs  Structure of Materials 110 ~ 1.5 hrs  Mechanical Properties of Metal 120 ~ 1.5 hrs  Physical Properties of Metals 130 ~ 1.5 hrs  Metal Manufacturing 140 ~ 1.5 hrs  Metal Classification 150 ~ 1.5 hrs  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 13 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Measurement, Materials, and Safety  NIMS Job Duty 2.1 Benchwork  NIMS Job Duty 2.2 Manual Operations, Layout  Hammer</p>
<p>Week 5  25 hrs</p>	<p>ToolingU Lessons  Intro to Materials 100 ~ 1.5 hrs  Structure of Materials 110 ~ 1.5 hrs  Mechanical Properties of Metal 120 ~ 1.5 hrs  Physical Properties of Metals 130 ~ 1.5 hrs  Metal Manufacturing 140 ~ 1.5 hrs  Metal Classification 150 ~ 1.5 hrs  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 13 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Measurement, Materials, and Safety  NIMS Job Duty 2.1 Benchwork  NIMS Job Duty 2.2 Manual Operations, Layout  Hammer</p>

Week 6 25 hrs	<p>ToolingU Lessons  Intro to Abrasives 100 ~ 1.5 hrs  What is Grinding? 110 ~ 1.5 hrs  Grinding Processes 120 ~ 1.5 hrs  Basics of the Manual Mill 110 ~ 1.5 hrs  Overview of Manual Mill Setup 200 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 14.5 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Measurement, Materials, and Safety  NIMS Job Duty 2.1 Benchwork  NIMS Job Duty 2.2 Manual Operations, Layout  Hammer  NIMS Measurement, Materials and Safety Assessment</p>
Week 7 25 hrs	<p>Manual Lathes and Mills – Lab Experiences ~ 22 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance</p>	<p>Competency Profile  Daily Reflection Log  NIMS Job Duty 2.1 Benchwork  NIMS Job Duty 2.2 Manual Operations, Layout  Hammer</p>
Week 7 continued		
Week 8 25 hrs	<p>Manual Lathes and Mills – Lab Experiences ~ 22 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance</p>	<p>Competency Profile  Daily Reflection Log  NIMS Job Duty 2.1 Benchwork  NIMS Job Duty 2.2 Manual Operations, Layout</p>
Week 9		Competency Profile





	<p>NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 10 hrs</p>	
<p>Week 12 25 hours</p>	<p>ToolingU Lessons  Fanuc Mill: Control Panel Overview 250 ~ 1.5 hrs  Fanuc Lathe: Control Panel Overview 255 ~ 1.5 hrs  Fanuc Mill: Entering Offsets 260 ~ 1.5 hrs  Fanuc Lathe: Entering Offsets 265 ~ 1.5 hrs  Fanuc Mill: Locating Program Zero 270 ~ 1.5 hrs  Fanuc Lathe: Locating Program Zero 275 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 13 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  Steam Engine</p>
<p>Week 12 continued</p>	<p>ToolingU Lessons  Fanuc Mill: Program Execution 280 ~ 1.5 hrs  Fanuc Lathe: Program Execution 285 ~ 1.5 hrs  Fanuc Mill: Program Storage 310 ~ 1.5 hrs  Fanuc Lathe: Program Storage 315 ~ 1.5 hrs  Fanuc Mill: First Part Runs 320 ~ 1.5 hrs  Fanuc Lathe: First Part Runs 325 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 13 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  Steam Engine</p>
<p>Week 13 25 hours</p>	<p>ToolingU Lessons  Fanuc Mill: Program Execution 280 ~ 1.5 hrs  Fanuc Lathe: Program Execution 285 ~ 1.5 hrs  Fanuc Mill: Program Storage 310 ~ 1.5 hrs  Fanuc Lathe: Program Storage 315 ~ 1.5 hrs  Fanuc Mill: First Part Runs 320 ~ 1.5 hrs  Fanuc Lathe: First Part Runs 325 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 23: General Housekeeping and Maintenance  NIMS Module 24: Preventative Maintenance: Machine Tools  NIMS Module 25: Tooling Maintenance  Lab Experiences and Demonstrations ~ 13 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  Steam Engine</p>
	<p>GibbsCAM ~ 22 hrs  Intro Mill  Advanced Mill and Intro 3D  Solid Surfacers</p>	<p>GibbsCAM  Competency Profile  Daily Reflection Log  Steam Engine</p>

<p>Week 14 25 hours</p> <p>Week 14 continued</p>	<p>3D Machining Intro Lathe NIMS Module 7: Participation in Processes Improvement NIMS Module 8: Manual Operations: Layout NIMS Module 9: Manual Operations: Benchwork NIMS Module 10: Sawing NIMS Module 11: Job Process Planning NIMS Module 12: Drilling Operations NIMS Module 13: Turning Operations: Turning between Centers Level I NIMS Module 15 and 16: Turning Operations: Chucking Level I NIMS Module 23: General Housekeeping and Maintenance NIMS Module 24: Preventative Maintenance: Machine Tools NIMS Module 25: Tooling Maintenance</p>	<p><b>NIMS Measurement, Materials and Safety Assessment</b></p>
<p>Week 15 25 hours</p>	<p>GibbsCAM Design Application ~ 22 hrs NIMS Module 7: Participation in Processes Improvement NIMS Module 8: Manual Operations: Layout NIMS Module 9: Manual Operations: Benchwork NIMS Module 10: Sawing NIMS Module 11: Job Process Planning NIMS Module 12: Drilling Operations NIMS Module 13: Turning Operations: Turning between Centers Level I NIMS Module 15 and 16: Turning Operations: Chucking Level I NIMS Module 23: General Housekeeping and Maintenance NIMS Module 24: Preventative Maintenance: Machine Tools NIMS Module 25: Tooling Maintenance</p>	<p>GibbsCAM Competency Profile Daily Reflection Log <b>NIMS Planning, Benchwork, and Layout Assessment</b> upon successful sponsor inspection of NIMS Job Duty 2.1 Benchwork and NIMS Job Duty 2.2 Manual Operations, Layout</p>
<p>Week 16 25 hours</p>	<p>Individual Design and Build</p>	<p>Competency Profile Daily Reflection Log</p>
<p>Week 17 25 hours</p>	<p>Individual Design and Build</p>	<p>Competency Profile Daily Reflection Log</p>
<p>Week 18 25 hours</p>	<p>Individual Design and Build</p>	<p>Competency Profile Daily Reflection Log <b>NIMS Planning, Benchwork, and Layout Assessment Exam</b></p>



### 3 credits – Applied Mechanical Engineering II - 18 Weeks

**Prerequisite: NIMS Measurement, Materials and Safety Credential**

<p>Week 19 22 hours</p>	<p>ToolingU Lessons  Quality Overview 100 ~ 1.5 hrs  ISO 9000 Overview 110 ~ 1.5 hrs  Approaches to Maintenance 120 ~ 1.5 hrs  Lean Manufacturing Overview 130 ~ 1.5 hrs  Intro to Supply Chain Management 140 ~ 1.5 hrs  Total Productive Maintenance Overview 150 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 17 - Milling: Square Up a Block  NIMS Modules 18 &amp; 19 - Manual Milling: Vertical and Horizontal  NIMS Module 20 - Surface Grinding: Grinding Wheel Safety  NIMS Modules 21 &amp; 22 - Surface Grinding, Horizontal Spindle  NIMS Module 23 - General Housekeeping and Maintenance  NIMS Module 24 - Preventative Maintenance: Machine Tools  NIMS Module 25 - Tooling Maintenance  NIMS Module 26 - CNC Basic Programming  Lab Experiences and Demonstrations ~ 13 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Job Duty: 2.4 Turning Operations: Chucking  NIMS Job Duty: 2.5 Milling: Square Up a Block  NIMS Job Duty: 2.6 Vertical Milling</p>
<p>Week 20 22 hours</p>	<p>ToolingU Lessons  Introduction to 5S 155 ~ 1.5 hrs  Cell Design and Pull Systems ~ 1.5 hrs  Intro to Six Sigma 170 ~ 1.5 hrs  Troubleshooting: Identifying Problems 180 ~ 1.5 hrs  Troubleshooting: Understanding Causes and Effects 182 ~ 1.5 hrs  Troubleshooting: Taking Corrective Actions 184 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 17 - Milling: Square Up a Block  NIMS Modules 18 &amp; 19 - Manual Milling: Vertical and Horizontal  NIMS Module 20 - Surface Grinding: Grinding Wheel Safety</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Job Duty: 2.4 Turning Operations: Chucking  NIMS Job Duty: 2.5 Milling: Square Up a Block  NIMS Job Duty: 2.6 Vertical Milling</p>
<p>Week 20</p>		

continued	<p>NIMS Modules 21 &amp; 22 - Surface Grinding, Horizontal Spindle  NIMS Module 23 - General Housekeeping and Maintenance  NIMS Module 24 - Preventative Maintenance: Machine Tools  NIMS Module 25 - Tooling Maintenance  Lab Experiences and Demonstrations ~ 13 hrs</p>	
Week 21 22 hours	<p>ToolingU Lessons  Conducting an Internal Audit 200 ~ 1.5 hrs  SPC Overview 210 ~ 1.5 hrs  TS 16949:2002 Overview 220 ~ 1.5 hrs  Metrics for Lean 230 ~ 1.5 hrs  Process Flow Charting 240 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 17 - Milling: Square Up a Block  NIMS Modules 18 &amp; 19 - Manual Milling: Vertical and Horizontal  NIMS Module 20 - Surface Grinding: Grinding Wheel Safety  NIMS Modules 21 &amp; 22 - Surface Grinding, Horizontal Spindle  NIMS Module 23 - General Housekeeping and Maintenance  NIMS Module 24 - Preventative Maintenance: Machine Tools  NIMS Module 25 - Tooling Maintenance  Lab Experiences and Demonstrations ~ 14.5 hrs</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Job Duty: 2.4 Turning Operations: Chucking  NIMS Job Duty: 2.5 Milling: Square Up a Block  NIMS Job Duty: 2.6 Vertical Milling</p>
Week 22 22 hours  Week 22 continued	<p>ToolingU Lessons  Strategies for Setup Reduction 250 ~ 1.5 hrs  Conducting Kaizen Events 260 ~ 1.5 hrs  Six Sigma Goals and Tools 310 ~ 1.5 hrs  NIMS Module 7: Participation in Processes Improvement  NIMS Module 8: Manual Operations: Layout  NIMS Module 9: Manual Operations: Benchwork  NIMS Module 10: Sawing  NIMS Module 11: Job Process Planning  NIMS Module 12: Drilling Operations  NIMS Module 13: Turning Operations: Turning between Centers Level I  NIMS Module 15 and 16: Turning Operations: Chucking Level I  NIMS Module 17 - Milling: Square Up a Block  NIMS Modules 18 &amp; 19 - Manual Milling: Vertical and Horizontal  NIMS Module 20 - Surface Grinding: Grinding Wheel Safety  NIMS Modules 21 &amp; 22 - Surface Grinding, Horizontal Spindle</p>	<p>ToolingU  Competency Profile  Daily Reflection Log  NIMS Job Duty: 2.4 Turning Operations: Chucking  NIMS Job Duty: 2.5 Milling: Square Up a Block  NIMS Job Duty: 2.6 Vertical Milling</p>

	NIMS Module 23 - General Housekeeping and Maintenance NIMS Module 24 - Preventative Maintenance: Machine Tools NIMS Module 25 - Tooling Maintenance NIMS Module 26 - CNC Basic Programming Lab Experiences and Demonstrations ~ 17.5 hrs	
Week 23 22 hours	Team Design and Build	Competency Profile Daily Reflection Log NIMS Job Duty: 2.4 Turning Operations: Chucking NIMS Job Duty: 2.5 Milling: Square Up a Block NIMS Job Duty: 2.6 Vertical Milling
Week 24 22 hours	Team Design and Build	Competency Profile Daily Reflection Log NIMS Job Duty: 2.4 Turning Operations: Chucking NIMS Job Duty: 2.5 Milling: Square Up a Block NIMS Job Duty: 2.6 Vertical Milling
Week 25 22 hours	Team Design and Build	Competency Profile Daily Reflection Log NIMS Job Duty: 2.4 Turning Operations: Chucking NIMS Job Duty: 2.5 Milling: Square Up a Block NIMS Job Duty: 2.6 Vertical Milling
Week 26 22 hours	Team Design and Build	Competency Profile Daily Reflection Log NIMS Job Duty: 2.4 Turning Operations: Chucking NIMS Job Duty: 2.5 Milling: Square Up a Block NIMS Job Duty: 2.6 Vertical Milling
Week 27 22 hours	Team Design and Build	Competency Profile Daily Reflection Log <b>Exam</b>
Week 28 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log
Week 29 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log
Week 30 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log
Week 31 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log
Week 32	Class Design and Build	Competency Profile Daily Reflection Log



22 hours	Research Projects Work-Based Learning	
Week 33 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log
Week 34 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log
Week 35 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log <b>NIMS Machining Level I - Manual Milling Assessment</b> upon successful sponsor inspection of NIMS Job Duty: 2.5 Milling: Square Up a Block NIMS Job Duty: 2.6 Vertical Milling <b>NIMS Machining Level I - Manual Turning with Chucking Assessment</b> upon successful sponsor inspection of NIMS Job Duty: 2.4 Turning Operations: Chucking
Week 36 22 hours	Class Design and Build Research Projects Work-Based Learning	Competency Profile Daily Reflection Log <b>Exam</b>

## McNett, Edward

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**From:** McCauslin, Angie  
**Sent:** Wednesday, November 21, 2018 9:49 AM  
**To:** McNett, Edward  
**Subject:** FW: CCC&TC and McCormick & Company

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**From:** Todd Sabin -COMMERCE- <todd.sabin@maryland.gov>  
**Sent:** Tuesday, November 20, 2018 3:54 PM  
**To:** Blizzard, Timothy <TDBLIZZ@carrollk12.org>; Tracie Hall <Tracie\_Hall@mccormick.com>  
**Cc:** McCauslin, Angie <ACMCCA@carrollk12.org>  
**Subject:** CCC&TC and McCormick & Company

Hi Tim,

I want to introduce you to Tracie Hall, Director - Global Talent Management at McCormick & Company. Tracie is working with me and the Maryland Manufacturing Advisory Board on our Image of Manufacturing campaign to help create a positive perception of manufacturing as a career choice for school children and young adults. During one of our conversations, I had brought up the fantastic work you and the Carroll County Career and Technology Center are doing with your [Applied Mechanical Engineering](#) program. In turn, she had requested an introduction. Tracie has an impressive background in manufacturing workforce development in Texas, where she recently moved from, so this will help her understand the work being done in Maryland.

Tracie,

Per our discussion, I would like to introduce you to Tim Blizzard. Tim is one of the driving forces behind CCC&TC's manufacturing program. I have also copied Angie McCauslin, who works for the Carroll County school system and may be able to provide additional insight to the success of their program.

Please let me know how I may assist in any way to coordinate a meaningful exchange of ideas to make Maryland a better place to manufacture!

Regards,

**Todd N. Sabin, CPIM, CSCP**  
Manufacturing Program Manager  
Office of Strategic Industries and Entrepreneurship  
Maryland Department of Commerce  
401 E. Pratt Street, 15<sup>th</sup> Fl, Baltimore, MD 21202  
O: 410-767-0697  
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**P: 410-775-1441  
E: COMPLEXMFG@GMAIL.COM**

To whom it may concern:  
November 21, 2018

I am writing this letter in support of the “Excellence in Action Award” for the Carroll County Career and Technology Center’s Applied Mechanical Engineering program. Complex Manufacturing LLC. has been a partner of this program for over 10 years. Currently, all employees at Complex are graduates of this outstanding program. I have worked with Tim Blizzard and the Met-Tec to provide guidance and input on preparing his students for the workforce. Complex has also provided equipment upgrades through a variety of donations from tooling to milling machines. We have also sponsored fieldtrips and volunteered to mentor students in the program.

The Applied Mechanical Engineering program has done a tremendous job of offering the students career training and preparation that leads to a livable wage and continual learning through on the job training at many of the local manufacturers. We are proud to partner with the program at the Carroll County Career and Technology Center and look forward to the future workforce they are providing for us and the area manufacturers.

Best Regards  
Brad L Capece  
Owner

Denise Rickell  
Manager  
410-386-2820, Fax: 410-876-2977  
TT: 410-848-9747



Department of Economic Development  
Business & Employment Resource Center  
Carroll County Government  
224 North Center Street  
Westminster, Maryland 21157-5134

November 21, 2018

Edward C. McNett  
Assistant Supervisor of Career and Technology Education  
1229 Washington Road  
Westminster, MD 21157

Dear Mr. McNett,

The Carroll County Business/Employment Resource Center, a WIOA American Job Center and an agency of Carroll County Government's Department of Economic Development, is pleased to offer a letter of support for the Applied Mechanical Engineering program. This program is a very successful and vital program to the success of Carroll County's economic development. When our local manufacturers reach out to us in search of highly trained candidates, the Carroll County Career and Technology Center's Applied Mechanical Engineering program is the first place we direct them. They are *the* workforce pipeline for many of our companies.

Also, Carroll County has an active Manufacturing Consortium that is administered by the Carroll County Department of Economic Development. This group consists of many of our long time manufacturers as well as new businesses recently located to our county. This consortium of businesses meets quarterly and is pleased that the Applied Mechanical Engineering program is represented by you at these meetings. It is important for the businesses to learn more about your program but just as important that you are there to hear their needs and incorporate them into your program.

Manufacturing is a leading industry in Carroll County and we are pleased to have the Applied Mechanical Engineering program available to meet the needs of these businesses and also provide good jobs that offer a variety of opportunities for your students, our future workforce.

Sincerely,

Denise Rickell



November 21, 2018

To Whom It May Concern:

This letter is to voice our strong support for Carroll County Public Schools' (CCPS) application for the Excellence in Action Award in recognition of their outstanding Applied Mechanical Engineering program and their valuable contributions to workforce development.

CCPS teachers, administrators and staff are dedicated to providing innovative technical education programs that prepare students for career success. CCPS and the College work together in many ways to strengthen career and technical education in the County.

CCPS actively participates with Carroll Community College, Carroll County Economic Development and members of the manufacturing community on the Carroll County Manufacturing Roundtable. This group is dedicated to aligning workforce development with industry needs.

CCPS partners with the College to offer the Carroll County Manufacturing Fair. This event is designed to increase awareness of manufacturing career opportunities. The event is open to CCPS students, as well as the community.

CCPS partners with the College to provide a location for adult education courses which are aligned to NIMS credentials and utilize Gibbs CAM software. These credentials and CAM certification provide adult learners entry level skills for new career opportunities.

CCPS works closely with the College to ensure students are aware of higher education and workforce training programs available through the College. Additionally, the College and CCPS are currently exploring partnership opportunities for apprenticeship programs.

We value our partnership with Carroll County Public Schools and strongly recommend them for the Excellence in Action Award.

Sincerely,

A handwritten signature in black ink that reads 'Libby A. Trostle'.

Libby A. Trostle, Senior Director  
Corporate Services and Workforce Development  
Carroll Community College