

Career Technical Education



Career and technical education (CTE) focuses on high-demand, high-skill and relatively high-wage occupations. It seeks to better connect the skills and degrees that students are pursuing with the jobs that are currently available and expected to grow within the next ten years. Many of these careers are in the skilled trades, health care and STEM (science, technology, engineering and math) areas.

It's a good time to start thinking about these career opportunities when students are in middle school and high school. Businesses, government, schools, trade unions and community groups are gathering together to help ensure that students are provided with more information and choices on careers needed to sustain and grow our economy and develop the technical and critical thinking skills that employers desire. Students can start exploring CTE career pathways at a young age, and have the option to enter a career right from high school, continue on to a one-, two- or four-year college degree, or enter an apprenticeship program. Adult workers seeking a career change can also benefit from the demand for employees in these fields.

EARNING *
SKILLS *
POWER
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PEACE
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PEACE
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PEACE

High-paying, hands-on jobs of the future

FACTS

- The skilled trades are the hardest jobs for employers to fill. More than one million jobs are currently unfilled in manufacturing, trades, transportation and utilities.
- People with a CTE associate degree earn \$4,000 - \$16,000 more a year than those with a humanities associate degree.
- Health care jobs make up 12 of the 20 fastest-growing occupations.

More resources online:
mresa.org nmu.edu/cte

CTE

Career Technical Education

Automotive

Automotive Service Technician and Mechanic

Median Earnings

\$16.83/hour

(earnings range: \$9 - \$26/hour)

Projected Job Growth to 2024

+ 11.3% (National)

+ 5.5% (U.P.)

Education levels of current workers

43.9% high school diploma

22% some college

11% associate degree

3.4% bachelor's degree

ABOUT THE CAREER:

Automotive technicians and mechanics provide service and diagnostic procedures necessary to maintain and repair vehicles. The career offers a variety of opportunities ranging from drivability technician, alignment and suspension specialist, transmission specialist, service advisors, and managers. Opportunities for advancement may include factory and dealer representatives, management, and self-employment. Work at dealerships, independent garages, service stations and automotive stores.

WHAT YOU'LL LEARN AND DO:

- Train in modern laboratories equipped with current service and testing equipment.
- Work on steering, suspension and alignment, brakes, engines, electrical/electronic systems, drive trains, axles, transmissions, heating and air conditioning.



HS

High school CTE program

A MARESA/NMU high school program in Automotive Service Technology is offered at the Jacobetti Complex and is available to students in Grades 11 and 12 from all Marquette and Alger County high schools.

C

NMU Programs

Certificate (1 year)

Automotive Service

Jobs: service technician, parts salesperson, repair specialist.

Associate degree (2 years)

Automotive Service Technology

Jobs: auto body, electrical or service technician; brakes, engine repair, suspension or transmission specialist; glass installer; estimator; service manager; industrial salesperson.

Students are encouraged to take the State of Michigan certification exam in order to be better qualified for employment.



FACT:

40% of the automotive service workforce is age 45 or older, so there will be a large need for new technicians to replace those who retire.

PROFILE

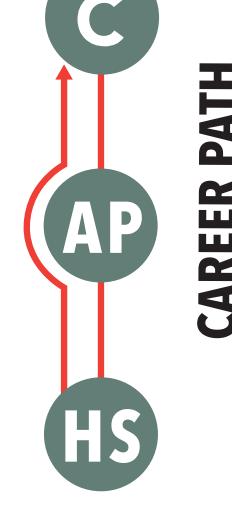
"At first I got interested in auto repair out of necessity," says Stephen Stewart, an NMU student from Niles, Michigan. "It started as a hobby to save money on fixing my own vehicles, but then I realized it could also be a way to make money as a career." He is currently employed at a local dealership as an auto technician and will be graduating with an associate degree this spring. Even with his on-the-job experience, Stephen has found the program to be helpful and exciting.

"I enjoy that in addition to theory, we get ample hands-on time in the auto lab. This gives myself and other students the chance to apply what we read in books and cover during lecture. The automotive instructors are especially helpfully whenever I have reached out for further help."

College: certificate and associate degree, state certification

Apprentice Programs:
Sheetmetal, Painter, Operator

High School: enter the workforce



CONTACT:

Jerry Bugni

jbugni@nmu.edu • 906-227-1538 • nmu.edu/tos

High School CTE: Brian Sarvello • bsarvello@meresa.org • 226-5135

CTE Career Technical Education

Aviation

Aircraft Mechanics and Service Technicians

Median Earnings

\$25.51/hour

(earnings range: \$14 - \$40/hour)

Projected Job Growth to 2024

+ 8.2% (National)

+ 14.5% (U.P.)

Education levels of current workers

12% high school diploma

60% college certificate

25% associate degree

ABOUT THE CAREER:

Aircraft and avionics equipment mechanics and service technicians keep aircrafts in peak operating condition, perform scheduled maintenance, make repairs and complete inspections required by the Federal Aviation Administration (FAA). Some may specialize in working on a particular type of aircraft or mechanical system.

WHAT YOU'LL LEARN AND DO:

Students work in the following five lab areas: powerplant, airframe, nondestructive testing, composite and sheet metal. Students do engine run-ups, repair and restoration of the operational status of the aircraft.



HS

High school CTE program

A MARESA/NMU high school program in Aviation Maintenance is available to students in Grades 11 & 12 from all Marquette and Alger County high schools. Students train at NMU's Jacobetti Complex aviation labs.

C

NMU Programs

Certificate program (1 year)

Aviation Maintenance Technology

Jobs: licensed A&P technicians—maintenance technicians and/or aircraft mechanics employed by major and commuter airlines, corporate aviation groups, and the manufacturing industry. Some are self-employed, while others are hired by the federal government or armed forces.

Associate degree (2.5 years)

Aviation Maintenance Technology

Jobs: maintenance technicians and/or aircraft mechanics employed by the same groups as above. In addition, associate degree graduates may also be prepared to fill entry-level management or supervisory level jobs in the aviation industry.

Bachelor's degree (4 years)

Industrial Technologies

All credits from the aviation associate degree can be applied to this bachelor's program to increase earning power and expand job possibilities with enhanced technical and management skills. See more in the "Industrial" section of this publication.

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HS

CAREER PATH

College: options from one-year certificate to 2.5 year associate degree

Apprentice Programs:
Electrician • Sheetmetal

High School: enter a training program offered by an air carrier

PROFILE

Charles Morey of Alma, Michigan, an NMU industrial technology major with an aviation maintenance degree, put his knowledge and courage to work this past summer. He flew to Alaska without a job or living arrangements to look for an airplane mechanic job. Within three days of flying to Alaska and handing out his resume, he accepted a job maintaining a fleet of 12 aircraft in the "bush," near Iliamna, Alaska, population of 109. Charlie says, "I felt confident heading up to Alaska without a job. My professors were great resources, saying it was possible. So I did just that, based on their recommendation." He adds, "The hands-on experience in the classroom was really good. Going into the job field I felt super prepared."

Earnings, job growth and education levels noted in this publication are from Economic Modeling Specialists Intl. (EMSI) and the Occupational Information Network (O*NET).

CONTACT: Mark Matteson

mmatteso@nmu.edu • 906-227-1529 • nmu.edu/tos

High School CTE: Brian Sarvello • bsarvello@meresa.org • 226-5135

CTE Career Technical Education

Construction

Construction Manager
Median Earnings

\$33.37/hour
(earnings range: \$14 - \$40/hour)

Projected Job Growth to 2024
+ 19.8% (National)
+ 28.8% (U.P.)

Education levels of current workers
26.9% high school diploma
25% some college
27.5% bachelor's degree
5.4% master's degree

WHAT YOU'LL LEARN AND DO:

Estimating, layout, blueprint reading, foundation and cement work, rough-in carpentry, roofing, wiring, interior and exterior finishing and siding, finish carpentry, possibly supervising workers.



HS

High school CTE program

Learn carpentry and construction skills by participating in the construction of a variety of projects, including large commercial buildings. Students are prepared for entry-level employment skills in the construction field and for participation in college-level construction-related programs such as construction management, construction engineering and architecture. Available to students in grades 10-12 at Ishpeming, Munising, Marquette, Superior Central and Westwood High Schools.

C

NMU Programs

Certificate program (1 year)

Heating, Ventilation, Air Conditioning and Refrigeration (HVACR)
Jobs: HVACR technician, apprentice and/or journeyman mechanic, installer, service technician, salesperson or estimator in a wide variety of settings.

Associate degrees (2 years)

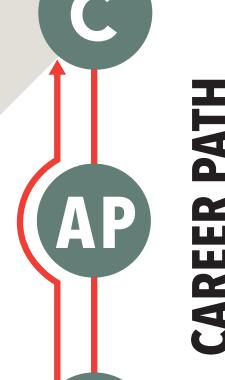
Building Technology
Jobs: carpenter, building inspector, building maintenance technician, material salesperson, cement finisher, construction foreman, assistant estimator, surveyor, concrete and/or steel detailer, structural drafter, expeditor, and more.

Climate Control Technology

Jobs: HVACR specialist creating comfortable, healthy, and energy-efficient indoor environments, including for the storage of food and medicine, transportation, warehouses, factories, and many other essential settings.

Bachelor's degree (4 years)

Construction Management
Jobs: construction planner, site supervisor, scheduler, cost estimator, assistant project manager, logistics manager, environmental controller, building inspector, and contractor. With specialized training: electrician, plumber or HVACR contractor. Construction managers apply a unique grouping of management techniques to the planning, design, and construction of a project in order to control the time and cost to complete the project and the quality of the construction.



College: options from one-year to four-year or master's degree programs in specialty fields such as climate control or estimating or overall skills as construction site manager

Apprentice Programs: Carpenter
• Electrician • Plumber/Pipefitter
• Painter • Bricklayer • Laborer

High School: work for area contractors
• become a licensed contractor

FACT: The Superior Plumbing & Mechanical Contractor's Association offers a paid apprenticeship program for highschoolers.
Contact: Scott Duer at 249-1441

CONTACT: Heidi Blanck
hblanck@nmu.edu • 906-227-1721 • nmu.edu/tos
High School CTE: Brian Sarvello • bsarvello@mresa.org • 226-5135

PROFILE

NMU graduate Luke Oberdorfer '10 BS, '14 MBA gained valuable, hands-on experience when offered an internship, and eventual full-time employment, with Miron Construction during the creation of NMU's new John X. Jamrich Hall.

After completing an associate degree in building technology and a bachelor's degree in construction management in just three years, Luke decided to pursue a master's of business administration from NMU's College of Business. "I had a little extra time having graduated early, so I wanted to make myself more attractive to employers. Gaining that business knowledge through the MBA was a great way achieve that," says Oberdorfer.

He was amazed with the amount of pre-planning that went into new Jamrich. Architects and building partners planned for years, brainstorming ways to make the building efficient, user-friendly and appealing.

CTE Career Technical Education

Electrical

Electrical Engineer Median Earnings

\$26.72/hour

(earnings range: \$17 - \$38/hour)

Projected Job Growth to 2024

+ 10.4% (National)

+8.2% (U.P.)

Education levels of current workers

3.3% high school diploma

8.5% some college

9.1% associate degree

48.6% bachelor's degree

25.3% master's degree

ABOUT THE CAREER:

This field provides a wide range of choices for career paths. You could work for the power industry on systems that run thousands of volts and power the entire country. Or work for a company such as Intel that makes the chips that power laptops, tablets and phones on only one to two volts. Or lead the way with alternative energy. Locally, you might work for Cliff's Natural Resources, Eagle Mine or Potlatch. There are a multitude of opportunities within these areas and many others, from field service to manufacturing.

WHAT YOU'LL LEARN AND DO:

- Get a strong background in AC and DC circuit analysis, analog and digital electronics
- Knowledge of industrial machines, controls and systems
- Experience with programmable controllers (PLC's) and process control systems
- Embedded system / microcontroller programming and design
- Testing and data acquisition processes and techniques

HS

High school CTE program

A high school program in Electrical and Electronic Equipment Installation & Repair prepares students to apply technical knowledge and skills to operate, maintain, and repair electrical and electronic equipment. It includes instruction in electrical circuitry, simple gearing, linkages and lubrication of machines and appliances, and the use of testing equipment. Available to students in grades 11 & 12 and offered at Westwood High School, but also open to students from Ishpeming and Negaunee.

C

NMU Programs

Diploma (1 year)

Electrical Line Technician

Jobs: line technician employed by public utilities, electrical transmission contractors and related employers. A program in partnership with the Lake Superior Community Partnership Foundation, offered at a special training facility at K.I. Sawyer.

Associate degree (2 years)

Electrical Technology

Choose from a concentration in:

- Electrical Power Technician. Jobs: electrical utility field—a very high demand career field with excellent compensation.
- General Electronics. Jobs: Customize your studies to meet your interests and career goals, whether it's making electric guitars or working with alternative energy.
- Industrial Electrical. Jobs: paper mills to manufacturing facilities installing, maintaining or repairing industrial electrical equipment and machines.

Bachelor's degree (4 years)

Electronics Engineering Technology

Jobs: In a variety of fields including product design, prototyping, testing, automation/robotics, computers, instrumentation and maintenance.

Minor

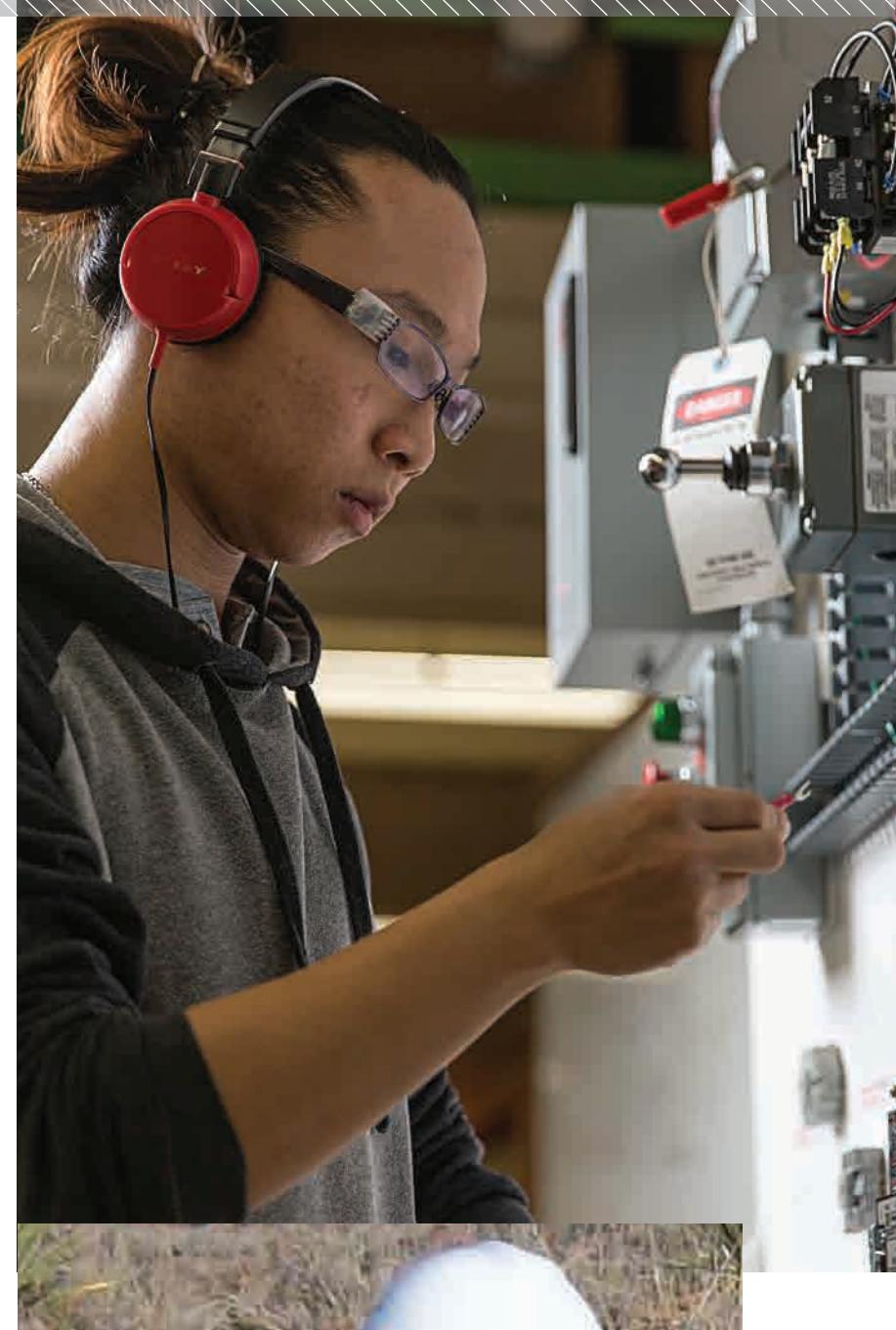
Alternative Energies

Jobs: Work for solar, wind or bioenergy companies or startups.

College: paid internship; diploma to bachelor's and beyond

Apprentice Programs: Electrician (programs offered for all U.P. counties)

High School: work as an entry-level assistant



PROFILE

Suzanne Brzoznowski works for Realtime Utility Engineers in Madison, Wisconsin, as a design engineer. In the near future, she will become a project engineer, working to design power transmission lines and wind parks.

So far she has completed 20 wind park design packages and nearly 100 transmission line projects. She has also had the opportunity to train a number of younger engineers and to speak at several conferences. Suzanne will be credited in a technical publication on a study of the effects of wind and debris on distribution systems.

Suzanne graduated from NMU in 2008 with a bachelor of science degree in electrical engineering technology and in 2006 with a lineman apprenticeship training certificate.

"My classes taught me how to work in groups and understand that there are multiple ways to accomplish any task," she says.

FACT:

Electrical Power Technicians are in very high demand and work nationwide with very high pay.

CONTACT: Mike Rudisill

engtech@nmu.edu • 906-227-2141 • nmu.edu/tos

High School CTE: Brian Sarvello • bsarvello@mresa.org • 226-5135

CTE Career Technical Education

Industrial

Industrial Machinery Mechanic Median Earnings

\$23.65/hour

earnings range: \$13 - \$30/hour

Projected Job Growth to 2024

+ 20.1% (National)

+2.2% (U.P.)

Education levels of current workers

42.6% high school diploma

28.6% some college

12.3% associate degree

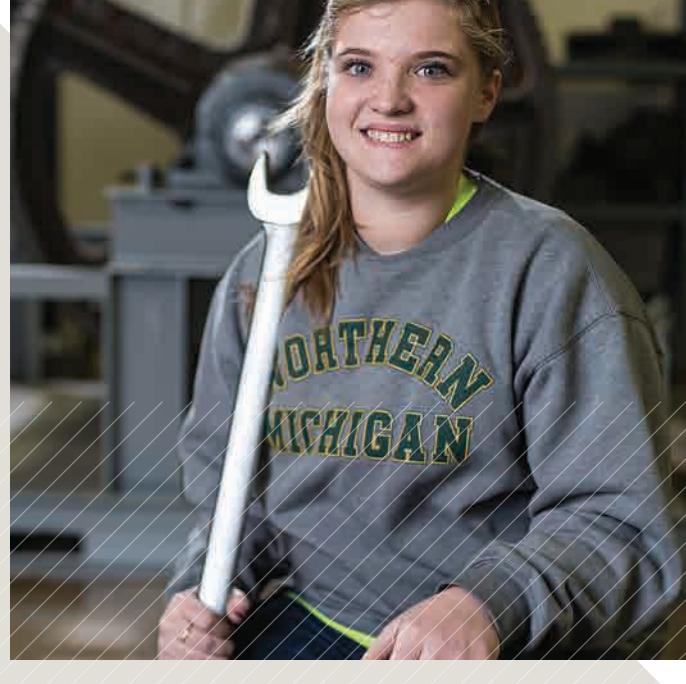
5.1% bachelor's degree

ABOUT THE CAREER:

Manage or run a manufacturing or other industrial facility or work as a technician to install, maintain and repair all types of machinery used in an endless array of modern power transmission applications. Mines, paper mills, hospitals and manufacturing companies of all sorts require the services of skilled industrial maintenance technicians to keep their operations running smoothly. Welding is a specialty that is in very high demand. Another option is to become a teacher to train and inspire future technicians.

WHAT YOU'LL LEARN AND DO:

- Strong background in static and dynamic forces, materials design
- Knowledge of industrial machines, controls and systems
- Experience with Computer Aided Design and simulation software
- Experience with solid modeling and finite element analysis
- Materials properties and testing techniques
- System testing and data acquisition processes and techniques
- Supervisory and management skills
- Knowledge of metals, welding processes and applications (welding program)



HS

High school CTE program

A high school program in Welding prepares students for entry-level jobs or further education. The instructional format is self-paced. American Welding Society Certification tests are available to students in ARC, MIG, and flux core ARC welding, leading to a nationally recognized certificate valuable for securing employment. Students will also receive an introduction to basic machining principles including work on a mill and lathe. The programs are typically available to students in grades 10-12 and are offered at Negaunee and Westwood High Schools. In addition, a MARESA/NMU high school program in Welding is offered at the NMU Jacobetti Complex and available to students in Grades 11 & 12 from all Marquette and Alger County high schools.

C

NMU Programs

Certificates

Industrial Maintenance

Jobs: maintenance technician, equipment rigger.

Welding

Jobs: Production welder, weld inspector, engineer, plumber, pipefitter, boilermaker, salesperson, consultant.

Associate degree (2 years)

Industrial Maintenance Technology

Jobs: engineering, industrial or manufacturing technician; industrial engineering analyst; methods or process engineer or analyst; production staff worker; quality control engineering technician.

Bachelor's degrees (4 years)

Industrial Technologies

With the technical focus of your degree set by your associate degree or minor, the job possibilities are practically unlimited, whether your interest is aviation, CNC machining, HVAC or virtually any other technical area.

Jobs: product integrity engineer, head of operations and logistics, liaison engineer, asset management manager, materials/production planner, planner/scheduler; production control supervisor, quality management coordinator, quality tech; senior quality methods specialist.

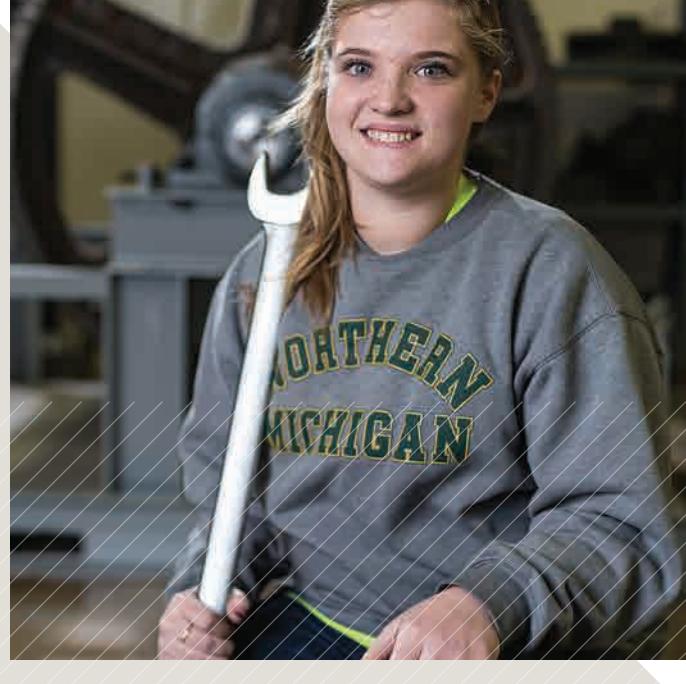
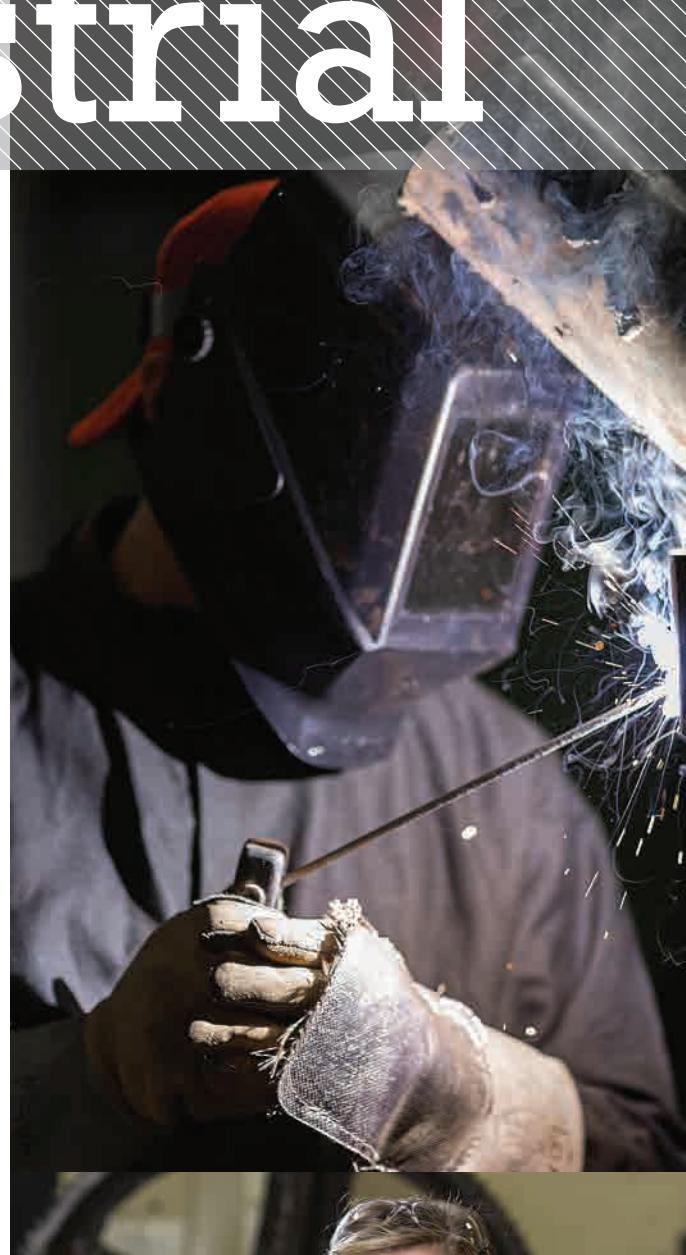
Secondary Education Industrial Technology

Jobs: Industrial technology teacher in elementary, middle or high school. Become certified to teach courses in woodworking, welding, machining and/or computers and computer aided design (CAD). A teaching minor will also allow you to instruct areas outside of technology.



FACT:

While hands-on technical training is essential to this career, research, writing, critical thinking and problem solving are also necessary in today's job market.



PROFILE

Sometimes college takes you places you don't expect. "Originally as a freshmen I was interested in radiology," explains NMU student Gabrielle Rauls. "After a while, I decided to switch my major, and I was interested in the blacksmithing program. I ended up taking a welding class as part of the curriculum. I really enjoyed how hands on it was. I personally learn more by experiencing things for myself, rather than hearing about it in a lecture." After earning her welding certificate, she says she still wanted to achieve a higher degree and continue to learn something that would challenge her. "I began looking into majors that my credits could go towards. That's when I made the decision that industrial maintenance was what I wanted to pursue. All the professors are very involved and really push all the students to succeed. It's a great feeling to know how supportive they are and how they really want you to do well." Gabrielle is set to graduate in May with an associate degree and is looking forward to what the future may bring. "I hope to go out west or to Alaska and work for a few years. I want to take advantage of my youth and this degree and see where it can take me."

College: paid summer internships; certificate, associate, bachelor's.



Apprentice Programs: ironworker, millwright, plumber, sheetmetal, boilermaker

CAREER PATH

High School: start an entry-level career

CONTACT: John Centko
jcentko@nmu.edu • 906-227-2190 • nmu.edu/tos

High School CTE: Brian Sarvello • bsarvello@mresa.org • 226-5135

CTE Career Technical Education

Mechanical

Mechanical Engineer
Median Earnings

\$29.62/hour
(earnings range: \$20 - \$45/hour)

Projected Job Growth to 2024
+ 9% (National)
+6.1% (U.P.)

Education levels of current workers

4.7% high school diploma
9.4% some college
11.4% associate degree
51.6% bachelor's degree
19.9% master's degree

ABOUT THE CAREER:

Mechanical engineering technology involves design, testing, production and utilization of all types of mechanical equipment. Employment may be in product design, prototyping, product testing, automation/robotics, instrumentation, hydraulics, fluid systems, and manufacturing.

Engineering design uses Computer Aided Design (CAD) programs and other computer-based programs to design and create mechanical part devices. Designers work with clients to create a customized item, using hand or computer sketches and wood, clay or plastic models to create prototypes and then work with manufacturers for the finished product. Industries such as automotive, toy, appliance, medical equipment, furniture, tool, housewares and construction often contract these services.

WHAT YOU'LL LEARN AND DO (varies by concentration):

- static and dynamic forces, materials and product development, design and testing
- industrial machines, controls and systems
- Computer Aided Design and simulation software
- solid modeling and finite element analysis
- electricity, hydraulics and material science
- machining skills & CNC machine operation and programming
- Geometric dimensioning and tolerancing



HS **High school CTE program**

A high school program in Drafting and Design Technology prepares students to enter the workforce or college as a skilled CAD technician. Students will graduate with advanced CAD skills by training on the most current CAD software. Students complete 2D and 3D projects with an emphasis on constructing what you design using advanced and specialized computer-aided drafting skills. The programs are typically available to students in grades 10-12 and are offered at Gwinn and Negaunee High Schools.

C **NMU Programs**

Certificate and Associate

Computer Numerical Control Technician

Jobs: Program and operate computer-driven machine tools to create precision components used in most high-tech products.

Associate degree (2 years)

Engineering Design

Jobs: CAD designer, engineering tech, mechanical designer. Employed by local companies such as RTI Surgical or Boss Plow.

Bachelor's degree (4 years)

Mechanical Engineering

Jobs: Design, dimensional control, manufacturing, mechanical, process, product or product engineer.

PROFILE

Rachel Griep is a junior at Northern Michigan University studying mechanical engineering technology with a concentration in design. Upon graduating, Rachel would like to engineer the next big thing to impact the world.

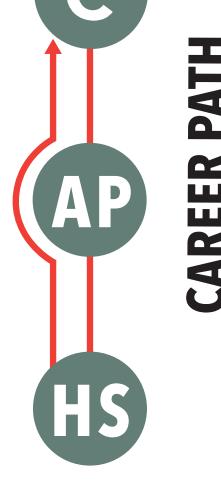
In the meantime, she is working at Invent@NMU, gaining valuable hands-on knowledge on how to effectively support product development and operations.

"It's a great opportunity to apply what I'm learning in the classroom and to get experience working in my field before I leave college," says Rachel. "This gives me a foot in the door to a mechanical engineering career. I'll be able to show how I've helped a product make it to market and the connections I make along the way will be very valuable."

College: paid internship; certificate to bachelor's and beyond

Apprentice Programs:
Millwright

High School: work as an entry-level CAD technician



FACT:

Many companies solicit NMU mechanical engineering students for paid summer internships. In fact, there are typically more positions available than students to fill them.

CONTACT: Mike Rudisill

engtech@nmu.edu • 906-227-2141 • nmu.edu/engineering

High School CTE: Brian Sarvello • bsarvello@mresa.org • 226-5135

CTE Career Technical Education

Hospitality/Food Service

Lodging Manager Median Earnings

\$22.32/hour

(earnings range: \$13 - \$35/hour)

Projected Job Growth to 2024
+ 1% (National)

Education levels of current workers

25% high school diploma

21% associate degree

28% bachelor's degree

ABOUT THE CAREER:

This career has a wide range of opportunities for those seeking a supervisory or leadership position in the hospitality and tourism industry. Skilled professionals work as general and assistant managers, hotel and restaurant managers, executive chefs or front line supervisors. They are sought after by government employers, such as the School Food Administration, Food and Drug Administration, Health Services, and correctional facilities, as well as by many businesses and companies within the hospitality industry, such as cruise lines, hospitals, educational institutions, and casinos. Others are self-employed as caterers, restaurant owners and operators, personal chefs, hotel and lodging operators, and bed and breakfast owners and operators.

WHAT YOU'LL LEARN AND DO:

Hospitality management, professional cooking, hospitality service management, hotel and lodging operations, hospitality operations plan and design, and marketing. Also how to coordinate front-office hotel activities, and manage staff and finances.

Food Service Manager Median Earnings

\$18.90/hour

(earnings range: \$12 - \$30/hour)

Projected Job Growth to 2024
+ 5.5% (National)

Education levels of current workers

29.2% high school diploma

28.1% some college

9% associate degree

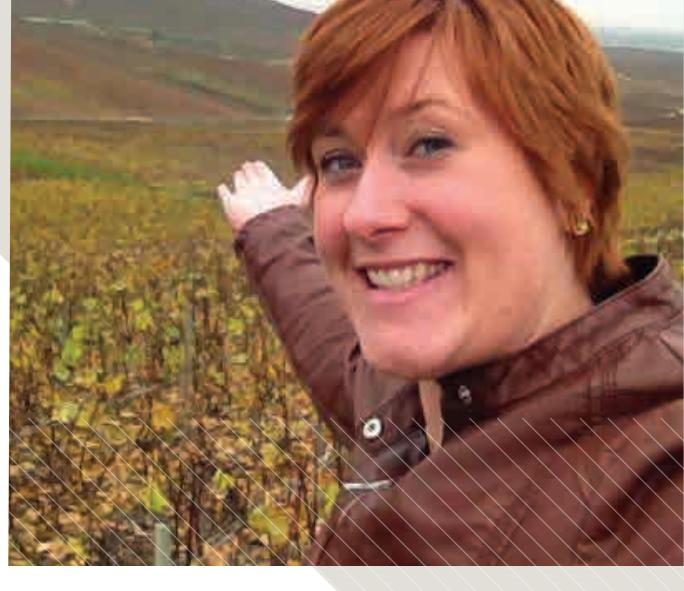
20.9% bachelor's degree

ABOUT THE CAREER:

Food service managers are sought by restaurants, institutional food service co-ops, educational institutions, hospitals, hotels, conference centers, resorts, casinos, nursing and personal care facilities, and catering services for positions as various types of cooks, chefs, deli workers, and food service workers and managers.

WHAT YOU'LL LEARN AND DO:

Select and price menu items, use food and other supplies efficiently, and achieve the highest quality preparation and service skills. Students will prepare for professional positions in food service and baking.



PROFILE

Katie Allen, a 2005 graduate of NMU's hospitality management program, is a buyer for Hilton Worldwide, based in the Washington, D.C. area, where she manages the relationships and orders between the hotel chain and its food and beverage suppliers. After NMU she went on to earn a master's degree in gastronomy from Boston University and has worked as a catering and tasting room manager. She also recently became certified as a sommelier by the Guild of Sommeliers.

College: internships; associate to bachelor's degree and beyond

Apprentice Programs: No formal programs in U.P.

High School: Work in the field while in school; MARESA/NMU ; entry level careers

CAREER PATH



HS

High school CTE program

A MARESA/NMU high school program in Culinary and Hospitality Services is offered at NMU's Jacobetti Complex and is available to students in Grades 11 & 12 from all Marquette and Alger County high schools.

C

NMU Programs

Associate degree (2 years)

Food Service Management

Bachelor's degree (4 years)

Hospitality Management



FACT:

Students in NMU's hospitality management program operate an on-campus restaurant (Chez Nous) that is open to the public. Students create, prepare, and serve a five-course dinner twice weekly that rivals top restaurants and resorts.

CONTACT: Chris Kibit

ckibit@nmu.edu • 906-227-1544 • nmu.edu/tos

High School CTE: Brian Sarvello • bsarvello@mresa.org • 226-5135

CTE Career Technical Education

Health Sciences

Clinical Sciences / Speech, Language and Hearing Science / Nursing / Pre-Medical

Clinical Laboratory Technologist

Median Earnings

\$26.54/hour

(earnings range: \$18 - \$38/hour)

Projected Job Growth to 2024

+14% (National)

Education levels of current workers

30% associate degree

59% bachelor's degree

5% master's degree

ABOUT THE CAREER:

Work in a variety of clinical pathology laboratories or assist surgeons, perform testing which may impact patients and health sciences. Students select a concentration in a unique clinical emphasis and test to become certified to practice.

WHAT YOU'LL LEARN AND DO:

Collect, prepare and analyze specimens, blood, bodily fluids or DNA. Use microscopes, cell counters, chemistry analyzers and molecular diagnostic equipment.

Speech, Language and Hearing Sciences

Speech-Language Pathologist

Median Earnings

\$34.78/hour

(earnings range: \$23 - \$47/hour)

Projected Job Growth to 2024

+19% (National)

Education levels of current workers

81% master's degree

19% post-master's certificate

ABOUT THE CAREER:

A speech-language pathologist helps those who stutter, have a disability, have had a stroke or other trauma or hearing impairments to increase their fluency, language and speech skills and assist their families. Practitioners must attain a master's or doctorate degree and will work for school systems, hospitals, community health agencies, or in private practice.

WHAT YOU'LL LEARN AND DO:

Phonetics, audiology, language disorders, cognitive neuroscience, methods of diagnosis and treatment; how to work with a variety of populations.

Nursing

Registered Nurse

Median Earnings

\$31.27/hour

(earnings range: \$23 - \$41/hour)

Projected Job Growth to 2024

+19% (National)

Education levels of current workers

11% some college

66% associate degree

23% bachelor's degree

ABOUT THE CAREER:

Nurses are concerned with the "whole person." They provide for physical, mental and emotional needs of patients. They work in a variety of settings. Opportunities are available for many different levels of education and specialties within the field.

WHAT YOU'LL LEARN AND DO:

Learn anatomy, physiology and pharmacology; observe, assess, record symptoms, reactions and progress; supervise others; manage stress and emergencies; work with physicians.

For more information about our graduation rates, the median debt of students who completed the program, and other important information, please see nmu.edu/institutionalresearch/disclosure

CONTACT: School of Health Sciences and Professional Studies 906-227-2435

High School CTE: Brian Sarvello • bsarvello@maresa.org • 226-5135

Pre-Medical Family practitioner

Median Earnings

\$85.28/hour

(earnings range: \$46 - \$90+/hour)

Projected Job Growth to 2024

+15% (National)

Education levels of current workers

3% post-master's certificate

65% doctoral degree

31% post-doctoral training

ABOUT THE CAREER:

A premedical college program prepares students for medical school. A wide variety of specialties, concentrating on various aspects of the human body are available.



WHAT YOU'LL LEARN AND DO:

Biology, microbiology, chemistry, physics, anatomy, physiology, genetics, immunology, histology, psychology and sociology.

High school CTE program

The Health Occupations high school program seeks qualified and motivated students and prepares them for pursuit of appropriate health careers. Curriculum concepts incorporate technological advances related to the health care delivery system, including ethics, professionalism, prevention (wellness), patient/client diagnosis, treatment, care, and rehabilitation as a result of disease/disorders. Opportunities for expanded leadership, management, technical, and citizenship development are available through membership in the Health Occupations Students of America (HOSA). Students also complete a semester-long clinical rotation at UP Health System. Available to students in Grade 12 and offered at Marquette and Ishpeming High Schools (also open to students from Negaunee and Westwood).

NMU Programs

C

Clinical Sciences

- Certificate
- Clinical Assistant
- Associate Degree
- Clinical Laboratory Technology
- Radiography
- Surgical Technology
- Bachelor Degree
- Speech, Language and Hearing Sciences
- Clinical Health Science

Clinical Laboratory Science

- Concentrations:
 - Anatomic Pathology
 - Clinical Systems Analyst
 - Diagnostic Genetics
 - Laboratory Medicine
 - Microbiology
 - Science Technologist

- Master's
Clinical Molecular Genetics

Nursing

- Certificate
- Practical Nursing
- Bachelor's Degree
- Nursing (BSN)
- LPN to BSN
- RN to BSN

- Doctorate
- Family Nurse Practitioner

Pre-Medical

- 4 year pre-professional program (students select a major and take additional specific classes)

PROFILE



Carly Johnson of Big Rapids, Michigan, is looking forward to graduating from NMU this spring with a bachelor's degree in clinical lab sciences with a concentration in diagnostic genetics and molecular biology.

She started off as a nursing student, but discovered that she preferred to work behind the scenes instead of directly with patients, while still making an impact on their lives. She says, "My major is awesome. I've gotten lots of hands-on laboratory experience in my field not only here at NMU but I have been placed into two internships."

This winter semester I have been accepted into the molecular genetics technology program at Mayo School of Health Sciences, which I am very excited for!" Carly says the internships make her much more confident in her abilities as a clinical laboratory technologist by putting her skills to the test in real clinical laboratory settings.

CTE Career Technical Education

Middle College

WHAT IS THE MIDDLE COLLEGE?

A tuition-free, early college program that enables students from Marquette and Alger Counties to:

- Earn a high school diploma.
- Take a significant number of college credits while in high school.
- Receive a Technical Certificate from Northern Michigan University at an accelerated pace—at no cost to students or their families.

WHY WAS IT CREATED?

The Marquette-Alger Technical Middle College (MATMC) was established in July 2014 to:

- Make college an affordable option for more students and families.
- Provide a gradual, structured, and supported transition from high school to college, resulting in greater college success and more residents with high-quality degrees and credentials.
- Create a strong incentive for students to pursue career pathways needed to sustain and grow our local economy.
- Establish a model of collaboration between high schools, colleges and local industries to produce an exceptional workforce with the academic, technical and employability skills desired by employers.

WHO CAN PARTICIPATE?

The Middle College targets students who have traditionally been underserved, especially those who are unengaged and at risk of dropping out of high school, economically disadvantaged and first-generation college students. It will, however, be open to all qualified students.

Teachers, counselors and administrators in our local schools will identify students who are capable of being successful at the college level but have no plans to attend college after high school.

The program will consider students who are willing to:

- Commit to a five-year program of study as opposed to the typical four-year path through high school.
- Pursue either a Career and Technical Education (vocational) or STEM (Science, Technology, Engineering and Mathematics) college certificate/degree program. Many options are available!

This educational option is the result of extraordinary collaboration between local school districts, the Marquette-Alger Regional Educational Agency, Northern Michigan University, the Marquette-Alger College Access Network, Great Lakes Center for Youth Development, business and industry and local communities. The MATMC is funded through a combination of local, state and federal funding sources, grants and corporate/business/community sponsorships.

WHY LIMIT STUDENTS TO PURSUING A CTE OR STEM DEGREE?

These are the two career areas where the greatest skills gap exist in our region, state and nation. Placement rates for most of these programs at NMU are at or near 100%. It provides a strong incentive for students to move into a career that is needed to sustain and grow our economy and will hopefully provide them with both a degree and a job.

HOW/WHEN CAN A STUDENT APPLY?

Students apply during the second semester of their high school sophomore year. They are required to submit an essay, letters of recommendation and, along with their parents, participate in an interview.

HOW DOES IT WORK?

Accepted students enroll in the MATMC prior to their junior year and take one dual enrollment course (UN 100) during the second semester of that school year. Students will take a minimum of one dual enrollment course during each semester of their senior (Grade 12) year. The hope is that by the end of Grade 12, students are ready for the rigor of a full college course load during Grade 13.

HOW CAN I FIND OUT MORE?

Visit www.matechmc.org



CONTACT: Brian Sarvello
bsarvello@maresa.org • 226-5135



MATMC Class of 2017 (Student name, high school, academy)

Front row left to right: James Mallos, MSHS, TEOSA; Caitlin Carter, MSHS, HSA; Paige Barber, MSHS, HSA; Zachary Carter, MSHS, TOESA; Cody Revord, MSHS, TOESA; back row left to right: Micah Johnson, NHS, TOESA; Jessica Barber, MSHS, HSA; Derek Rogers, NHS, TOESA; Preston Marchant, MSHS, HSA; Jordan Simula, MSHS, HSA; not pictured: Hailey Lancour, MHSH, HSA

MATMC Cohort 1:

High Schools: MSHS - Marquette Senior High School; NHS - Negaunee High School
Academies: HSA - Health Science Academy; TEOSA - Technology, Engineering and Occupational Science Academy

WHAT CERTIFICATES/DEGREES CAN STUDENTS EARN?

All middle college graduates will earn the Michigan Early and Middle College Association Certificate. Currently, students have the option of pursuing one of the following associate degrees from NMU:

MATMC HEALTH SCIENCES ACADEMY (Clinical Science Degrees):

- Clinical Laboratory Technology
- Radiography
- Surgical Technology

MATMC TECHNOLOGY, ENGINEERING AND OCCUPATIONAL SCIENCES ACADEMY

- Industrial Maintenance
- Building Technology
- Electrical Technology
- HVACR (Heating, Ventilation, Air Conditioning and Refrigeration)
- Automotive Service Technology

Additional associate degree options will be added in the future in response to industry demand.

Eagle Mine

a subsidiary of **lundin mining**

While the primary source of funding for the Technical Middle College is provided by the State of Michigan, Eagle Mine's commitment to the program is \$250,000 over three years (2015 to 2017) with the intent to renew support of the Middle College through Eagle's eight year mine life ending in 2022.

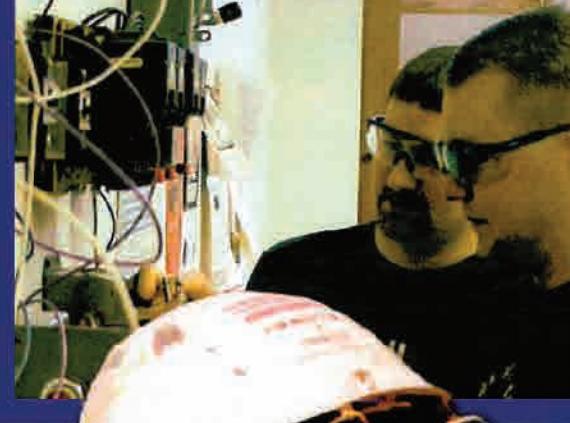
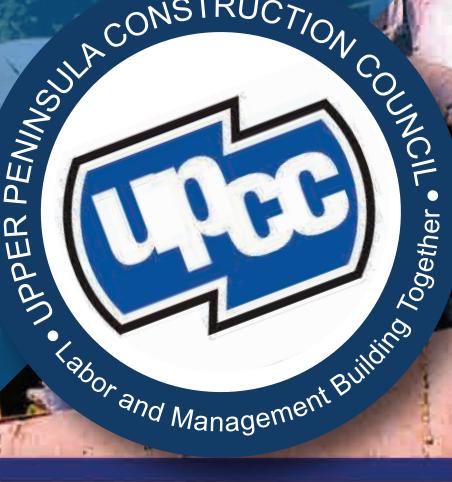
Eagle Mine's initial support of \$50,000 in 2015 will be used to supplement the state per-pupil funding, resulting in no cost to the student or their families to participate in the program. Beginning in 2016, Eagle will make an annual contribution of \$100,000, with \$50,000 of it being used to directly support the program and the other \$50,000 being used to establish an endowment fund. This model of funding aims to sustain the program long after Eagle Mine ceases operations.

CTE Career Technical Education

Apprenticeship

Average pay while on the job
training 3 to 5 years.

\$16.80/hour
Plus benefits

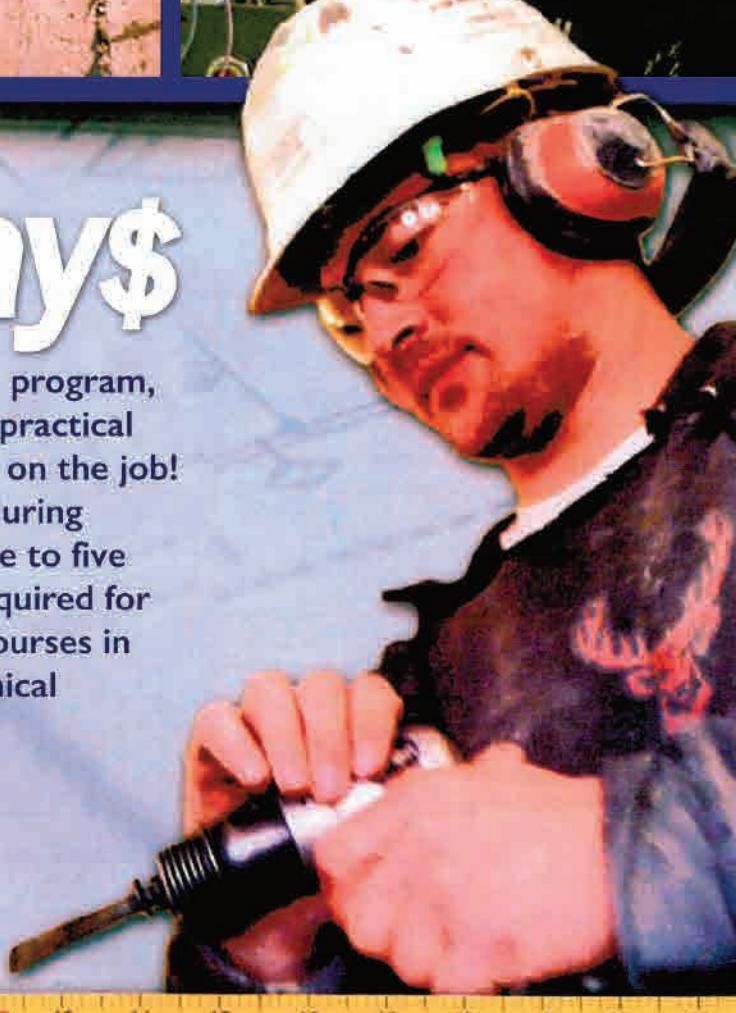


Apprenticeship Pay\$

When you're accepted into a certified apprenticeship program, you receive classroom training from instructors with practical experience, **PLUS** you get paid while you're learning on the job! The average apprentice earns about **35k per year** during on-the-job training. Apprenticeship training lasts three to five years depending on the trade. Admission tests are required for most of the trades and candidates with high school courses in general math, algebra, geometry, science and mechanical drawing are the most desirable.

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Training - not just for a job, but a career.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

Ironworkers JAC
119 S. Front St.
Marquette, MI 49855
(906) 228-6450

Carpenters JATC
1221 Division St.
Marquette, MI 49855
(906) 225-0703

Millwrights JATC
1221 Division St.
Marquette, MI 49855
(906) 225-9088

Electricians JATC
Mackinac, Luce, Chippewa,
Alger, Marquette Counties
119 S. Front St.
Marquette, MI 49855
(906) 226-7497

Electricians JATC
Delta, Schoolcraft,
Menominee Counties
1219 1st Ave., South
Escanaba, MI 49829
(906) 786-1773

Plumbers, Pipefitters JTC
2601 N. 30th St.
Escanaba, MI 49829
(906) 789-9784

Electricians JATC
Dickinson, Baraga, Houghton,
Iron, Keweenaw, Gogebic,
Ontonagon Counties
205 East Flesheim
Iron Mountain, MI 49801
(906) 779-1505

Plumbers,

Pipefitters JTC

2601 N. 30th St.
Escanaba, MI 49829
(906) 789-9784

Sheetmetal JATC
1500 W. Washington, Suite 7
Marquette, MI 49855
(906) 225-0585

Painters JAC
116 S. 9th St.
Escanaba, MI 49829
(906) 786-9626

Boilermakers
10154 M-35
Gladstone, MI 49837
(906) 428-2800

Bricklayers JAC
119 S. Front St.
Marquette, MI 49855
(906) 226-3015

Operators Local 324
2552 Hwy. 41 W., Suite 200
Marquette, MI 49855
(906) 225-7279

Laborer Local 1329
P.O. Box 863
Iron Mountain, MI 49801
(906) 774-6084

Requirements for Apprenticeship Applicants

ELECTRICIAN	IRONWORKERS	CARPENTER	MILLWRIGHT	PLUMBERS/ PIPEFITTERS	SHEETMETAL	PAINTERS	BOILERMAKER	BRICKLAYER	OPERATOR	LABORER
5	3	4	4	5	4	4	4	3	3	3

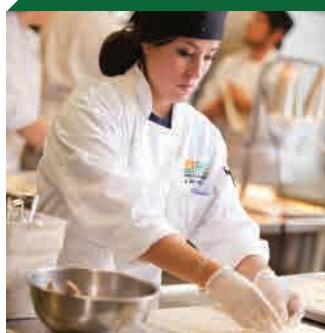
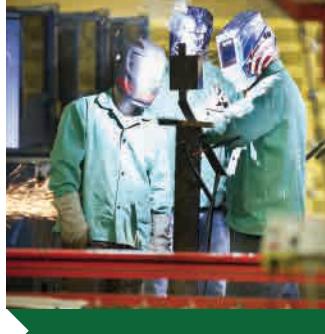
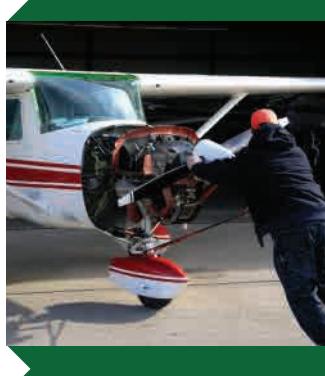
Length of the program in years	5	3	4	4	5	4	4	4	3	3
Education										
High School or equivalent	Req.	Req.	Req.	Req.	Req.	Req.	Req.	Req.	Req.	Req.
High School Preparation										
General Math	Des.	Req.	Des.	Des.	Des.	Des.	Des.	Req.	Des.	Req.
Algebra	Req.	Des.	Des.	Des.	Req.	Req.	Des.	Des.	Des.	Des.
Geometry	Pref.	Des.	Des.	Des.	Pref.	Pref.	Des.	Des.	Des.	Des.
Science	Des.	Des.	Des.	Des.	Des.	Des.	Des.	Des.	Des.	Des.
Mechanical Drawing	Des.	Des.	Des.	Des.	Pref.	Des.	Des.	Des.	Des.	Des.

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Training - not just for a job, but a career.

Req. - Required
Des. - Desired
Pref. - Preferred

CTE Career Technical Education



Learn it in the classroom.
Apply it with today's tools
and technology.
Land a great job.

CENTER FOR INNOVATION & INDUSTRIAL TECHNOLOGIES

OPEN HOUSE

Wednesday, February 11

4:30 - 6:30 p.m.

NMU Jacobetti Complex

Tour our learning labs. Meet with faculty and current students to discuss programs and career choices.

Enter to win a \$500 NMU scholarship!

- Automotive Service
- Aviation Maintenance
- Building Technology
- Climate Control Technology
- Computer Numerical Control Technology
- Construction Management
- Cosmetology
- Electrical Line Technician
- Electrical Power Technician
- Electronics Engineering Technology
- Engineering Design
- Food Service Management
- General Electronics
- Hospitality Management
- Heating, Ventilation, Air Conditioning, and Refrigeration
- Industrial Electrical
- Industrial Maintenance
- Industrial Technologies
- Industrial Technology Education
- Mechanical Engineering Technology
- Welding

www.nmu.edu/CIIT

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