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Where/how to get training

Education

An experienced machinist/tool and die maker can almost name his/her price in today's high technology industrial revolution. A qualified machinist, however, must follow a time-tested road...training, training and more training. Success in this field requires education and experience well beyond the high school level.

The Machining Technology program at Johnston Community College is designed to develop skills in the theory and safe use of hand tools, power machinery, computerized equipment and sophisticated precision inspection instruments. Basic machining skills and introductory computer numerical control (CNC) courses are introduced early in the program. Second year work emphasizes the set-up and operation of CNC machines, advanced CNC parts programming, CAD/CAM (computer assisted design/computer assisted manufacturing) operations and quality assurance inspection skills.

Related coursework includes blueprint reading, applied mathematics, microcomputer skills and quality assurance theory.

Students learn to interpret blueprints, set up manual and computer numerical control (CNC) machines, perform basic and advanced machining operations and make decisions to insure that work quality is maintained.

Graduates of the two-year Associate degree program will prepare themselves for employment opportunities as machining technicians in manufacturing industries, public institutions, governmental agencies and in a wide range of specialty machining job shops. They will have the knowledge and skills to:

- *interpret drawings
- *operate milling machines, bench grinders and use hand tools
- *plan work
- *act as a CNC parts programmer or CNC machine set-up operator
- *operate lathes, drill presses and other precision tools



For more information on federal financial aid programs, call (800) 4-FEDAID

SCHOOL to career

focus on jobs in

Machining Technology

Machinists are highly skilled craftsmen who use simple hand tools or sophisticated machines to shape or form parts made of metal or other materials.

Shaping is accomplished in four general ways: (1) by cutting excess material in the form of chips from the part; (2) by shearing the material; (3) by squeezing metallic parts to the desired shape; and (4) by applying electricity, ultrasound or corrosive chemicals to the material, processes for machining ultra-hard metals not machinable by other methods.

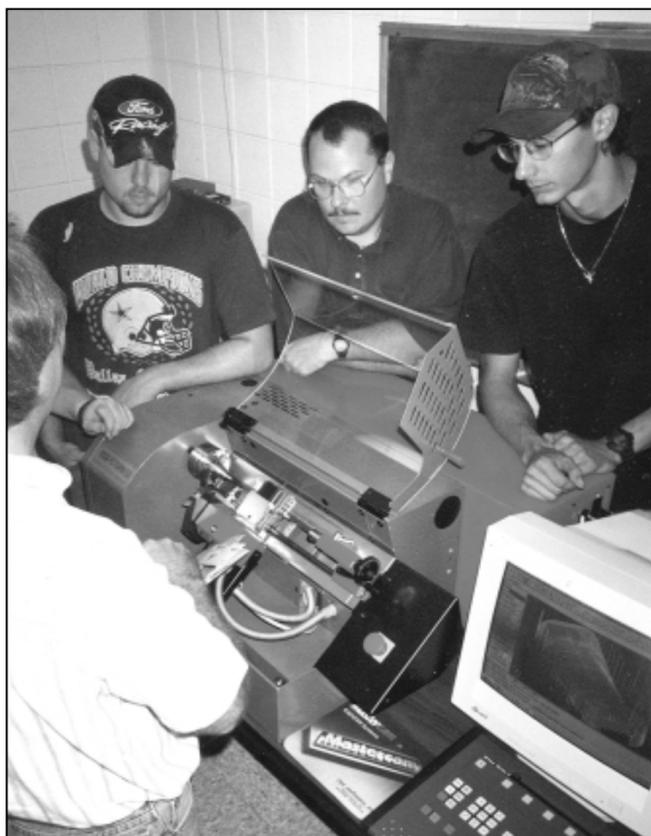
Machining is a precision process--- modern machine tools can cut or form parts to tolerances of plus or minus one ten-thousandth of an inch (0.0025 millimeter). Hundreds of varieties of metal machine tools, ranging in size from small machines mounted on workbenches to huge production machines weighing several hundred tons, are used in modern industry. They are classed as one of the following: (1) turning machines (lathes and boring mills), (2) shapers and planers, (3) drilling machines, (4) milling machines, (5) grinding machines, (6) power saws, and (7) presses.

A dramatic and exciting change in the manufacturing process in recent years has been the increased use of computer numerical control (CNC) systems. This means that the machinist must now be comfortable with computer systems, computerized production monitors, testing devices and feedback-controlled production robots, in addition to the skills associated with a multitude of metal-working hand tools and automated equipment.

The programmability of the digital computer to handle a wide range of tasks, along with the capability of rapid change to a new program, has made it invaluable for manufacturing purposes. Another benefit is that, after the programmable manufacturing process has been set up by a skilled machinist, a person of lesser skill can operate it, thereby leading to lesser production costs.

Some CNC processes are so sophisticated today that they can continue the manufacturing process at night or on weekends with little or no human supervision.

The technology of CNC machine tools has been enhanced by parallel advances in CAD/CAM. CAD enables designers to use computers to analyze and manipulate design data. Details of the completed design are transferred to a second terminal



on which a set of engineering drawings can be produced. After calculating the necessary tool movements, the computer develops a complete machining program for the part to be manufactured on the CNC machine.

In today's job market, technical training offered at our community colleges or through apprenticeship programs is essential in opening the door to machinist careers. Many years of on-the-job experience and training are necessary, however, to reach the higher levels of the profession.

Future job opportunities

Manufacturing processes are continually evolving, and there will always be a need for the skilled machinist who creates the tools and dies and operates the complicated machinery necessary for production. As computer-aided manufacturing becomes more and more sophisticated and complex, opportunities will abound in the technical process areas of production.

What you wear



Most Machining Technologists work in machine shops. Dress is comfortable, casual clothes.



Want to know more?

National Machine Product Association (NSMPA)
043 Silver Spring Drive
Sussex, WI 53089

National Tooling and Machining Association
9300 Livingston Road
Ft. Washington, MD
20744-4998

Johnston Community College
P. O. Box 2350
Smithfield, NC 27577
(919) 934-3051

Skills required

Machinist technicians must have a mathematical aptitude, manual dexterity, and a high degree of creativity.

Jobs in this field

Job Titles	Place of Work	Kind of work	Average salary*
Machinist technician	Manufacturing, Government agency, Machine shop	Routine milling or production	\$20,000 - \$23,000
Machine set-up	Manufacturing, Machine shop	Set up machines for use by less skilled individuals	\$20,000 - \$25,000+
CNC machine set-up technician	Manufacturing	Set up CNC machines for use by less skilled Individuals	\$23,000 - \$30,000+
CNC parts Programmer	Manufacturing	Program CNC machines	\$22,000 - \$35,000+

*Salaries based on entry-level positions

Activity

Look at the skills needed for Machining Technologists. Then scan the classified ads in today's newspaper to find job opportunities in this field. List the companies that have ads for these positions.

Profile

Lonnie Sawyer
Clayton, NC



Lonnie Sawyer started Sawyer Brothers Machine Tool ten years ago with his brother. He bought his brother out 2 years ago and has been running the business along with his wife, Tina, and six full time employees. His son, Lonnie, Jr., followed in his footsteps by working as a co-op and learning the trade while working with him. He graduated from Johnston Community College with a degree in Machining Technology.

Sawyer started working part time as a handyman in a local machine tooling shop when he was 16 years old in Mint Hill, NC, just outside of Charlotte. Sawyer said, "I got interested in machining because they could take different metals and make products, and could build molds that would mass produce. "Machine tooling requires a lot of highly skilled training and mechanical aptitude. Sawyer received his training at Central Piedmont Community College while working part time.

Sawyer Brothers produces molds or dies used in manufacturing parts for several companies. It supports maintenance, works with engineering, and builds tooling for Nortel Communications. Sawyer has worked on the prototype machine that adds in the process to eliminate human error in pap smears for women. He also builds tooling that is used in the automotive industry for products used on the Dodge Viper and other models. Sawyer has been chosen to be one of two shops selected to do OE tooling for the automotive industry. "What I like best about the work I do is the diversity and getting satisfaction from making the customer happy. I am forever challenged. I like the hands-on work and the ability to create a product from raw materials. We cut a company's cost by reducing their scrap to 2% per month," Sawyer says proudly.

Best advice

Get your education first. Start by learning the basics of the machining process. Computer training should follow. If you plan to start your own business, programming and design engineering would definitely be an asset.

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