

SAMPLE MANUFACTURING CAREER PATHWAY:

Production Jobs - Machinist

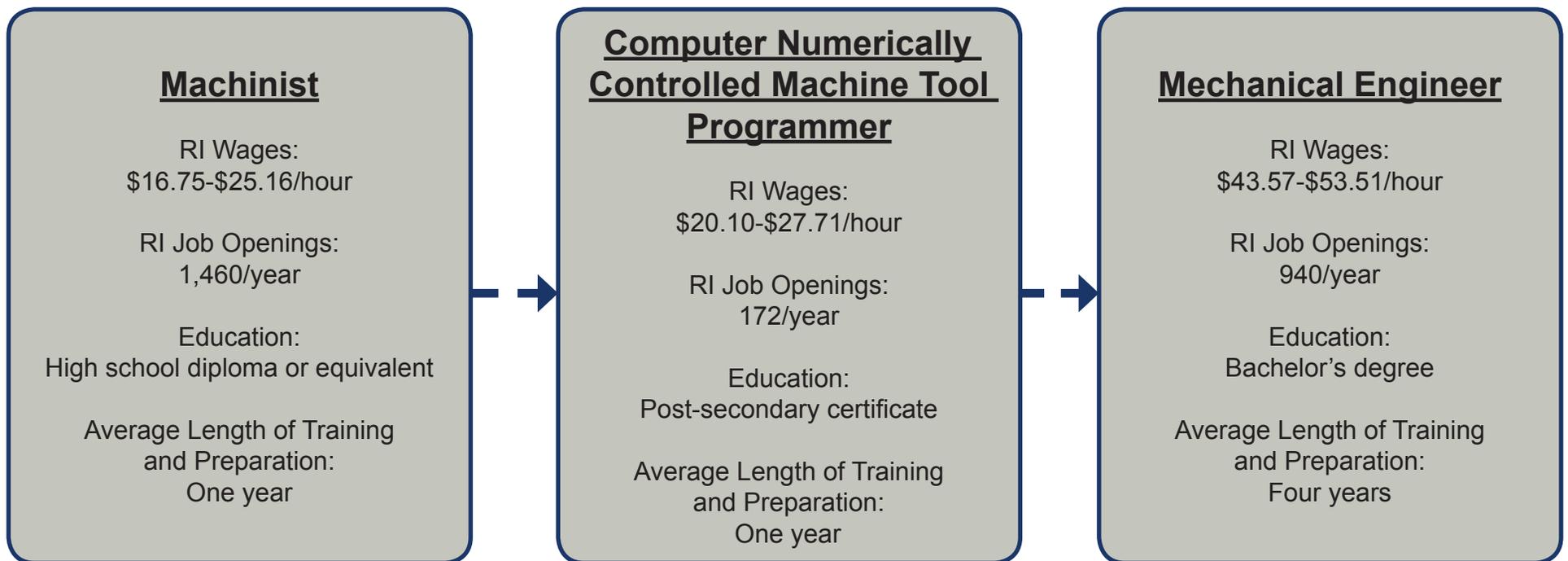
This is one of many ways to enter Rhode Island's manufacturing industry and move up through production jobs. You may enter or exit this pathway at any point.

Click on a job to learn more about:

- Wages
- How to prepare
- Education and training programs
- Exploring more options
- Needed skills and abilities



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Work Experience

Job Overview

Sample job titles: Gear Machinist, Journey Machinist, Machine Operator, Machine Repair Person, Machinist, Maintenance Machinist, Maintenance Specialist, Production Machinist, Set-Up Machinist, Tool Room Machinist

Job summary: Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.

Job Outlook

RI median wage:	\$ 20.87/hr	National median wage:	\$19.03/hr
RI wages:	\$16.75- \$25.16/hr	National wages:	\$15.03-\$23.75/hr
RI percent change in jobs through 2020:	7%	National percent change in jobs through 2020:	8%-14%
RI job openings:	1,460/per year	National job openings:	125,900/per year
Is this a high-demand job?	Yes		

How to Prepare

Education: High school diploma or equivalent

Find local education and training programs through the Eligible Training Program manufacturing list at <http://www.dlt.ri.gov/wio/ProgramsMfg.htm>

Contact the Manufacturing Industry Partnership for additional training programs or add on(s) that have not yet been identified.

- Contact: Chris Matteson, deputy director of Rhode Island Manufacturers Association,
- Phone: 401-345-5695
- Email: chrism@mfgri.com

Local training programs:

Introduction to CNC Manufacturing Certificate (ETCI)

- Provider: Community College of Rhode Island
- Type of certificate/degree awarded: Certificate
- Address: 400 East Ave, Warwick RI 02886
- Website: http://www.ccri.edu/engt/cert_cncmanufacturing/about.html

- Contact: 401-825-2156

CNC Certificate

- Provider: New England Institute of Technology
 - Type of certificate/degree awarded: Certificate
 - Address: 2500 Post Rd., Warwick, RI 02886
 - Website: www.neit.edu
 - Contact: Fred Santinello at 401-467-7744
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**Local
apprenticeship
options:**

Computer Numerically Controlled Machinist Apprenticeship Program

- Provider: CCRI Warwick
 - Type of certificate/degree awarded: Apprenticeship certificate
 - Address: 400 East Ave, Warwick, RI 02886
 - Website: www.ccri.edu
 - Contact: Jerry Bernadini, dean of engineering, at 401-825-1189
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**National Career
Readiness
Certificate level:**

Silver

The NCRC is being piloted on a limited basis and may not apply to all employment situations.

Certifications:

None required

Suggested:
Employees in these occupations usually need 1-2 years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with this occupation.

Licenses:

None required

Explore More Options

Similar jobs:

- [Computer – Controlled Machine Tool Operator Metals and Plastic](#)
 - [Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic](#)
 - [Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic](#)
 - [Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic](#)
 - [Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic](#)
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**Find local jobs and
internships:**

Visit the EmployRI job and internship search at <https://www.employri.org/jobbanks/>

**Find jobs
throughout the US:**

Visit the CareerOneStop job search at <http://www.careeronestop.org/JobSearch/>

Additional Job Details

Tasks:

- Advise clients about the materials being used for finished products
 - Align and secure holding fixtures, cutting tools, attachments, accessories, or materials
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onto machines

- Calculate dimensions or tolerances, using instruments such as micrometers or vernier calipers
 - Check work pieces to ensure that they are properly lubricated or cooled
 - Confer with engineering, supervisory, or manufacturing personnel to exchange technical information.
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Knowledge:

- **Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications
 - **Mechanical** — Knowledge of machines and tools, including their designs, uses, repair, and maintenance
 - **Production and Processing** — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods
 - **English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar
 - **Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models
 - **Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services
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Skills:

- **Operation Monitoring** — Watching gauges, dials, or other indicators to make sure a machine is working properly
 - **Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
 - **Operation and Control** — Controlling operations of equipment or systems
 - **Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times
 - **Coordination** — Adjusting actions in relation to others' actions
 - **Monitoring** — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action
 - **Reading Comprehension** — Understanding written sentences and paragraphs in work related documents
 - **Complex Problem Solving** — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions
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Abilities:

- **Arm-Hand Steadiness** — Ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position
 - **Manual Dexterity** — Ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects
 - **Control Precision** — Ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions
 - **Finger Dexterity** — Ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects
 - **Multi-limb Coordination** — Ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.
 - **Near Vision** — Ability to see details at close range (within a few feet of the observer)
 - **Information Ordering** — Ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations)
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Technology:

- **Analytical or scientific software** — Armchair Machinist software, CNC Consulting Machinists' Calculator, EditCNC software, Kentech Trig Calculator
 - **Computer aided design CAD software** — Autodesk AutoCAD software, Solid Works
 - **Computer aided manufacturing CAM software** — CNC Mastercam, CNC TurboCAD/CAM, JETCAM software
 - **Electronic mail software** — Microsoft Outlook
 - **Facilities management software** — Faster Fleet Management software
 - **Industrial control software** — Pro CNC software
 - **Office suite software** — Microsoft Office software
 - **Project management software** — Kentech Kipware software
 - **Spreadsheet software** — Microsoft Excel
 - **Word processing software** — Microsoft Word
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Computer Numerically Controlled Machine Tool Programmer, Metal and Plastic



Job Overview

Sample job titles: Computer Numerical Control Programmer (CNC Programmer), Process Engineer, Programmer, Programmer, Project Engineer, Software Engineer, Welding Engineer, CAD CAM Programmer (Computer-Aided Design Computer-Aided Manufacturing Programmer)

Job summary: Develop programs to control machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.

Job Outlook

RI median wage:	\$22.63/hr	National median wage:	\$22.36/hr
RI wages:	\$20.10-\$27.71/hr	National wages:	\$19.45-\$26.88/hr
RI percent change in jobs through 2020:	34%	National percent change in jobs through 2020:	22%
RI job openings:	172/per year	National job openings:	13,500/per year
Is this a high-demand job?	Yes		

How to Prepare

Post-Secondary Certificate

Education: This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines: Computer Science — Computer Programming/Programmer

Find local education and training programs through the Eligible Training Program Manufacturing list at <http://www.dlt.ri.gov/wio/ProgramsMfg.htm>

Contact the Manufacturing Industry Partnership for additional training programs or add on(s) that have not yet been identified.

- Contact: Chris Matteson, deputy director of Rhode Island Manufacturers Association,
- Phone: 401-345-5695
- Email: chrism@mfgri.com

CNC Manufacturing and 3D-Modeling (ETCA)

- Provider: Community College of Rhode Island
- Type of certificate/degree awarded: Certificate
- Address: 400 East Ave, Warwick RI 02886
- Website: http://www.ccri.edu/engt/cert_cncand3dmodeling/about.html
- Contact: 401-825-2156

Local training programs:

CNC Certificate

- Provider: New England Institute of Technology
- Type of certificate/degree awarded: Certificate
- Address: 2500 Post Rd., Warwick, RI 02886
- Website: www.neit.edu
- Contact: Fred Santinello at 401-467-7744

Introduction to Advanced Manufacturing and CNC Machining

- Provider: Workforce Performance Solutions
- Type of certificate/degree awarded: Certificate
- Address: 1845 Post Rd., Warwick RI 02886
- Website: www.iamcnc.com
- Contact: Barbara Jackson at 401-232-0077

Computer Numerically Controlled Machinist Apprenticeship Program

- Provider: CCRI Warwick
- Type of certificate/degree awarded: Apprenticeship certificate
- Address: 400 East Ave, Warwick, RI 02886
- Website: www.ccri.edu
- Contact: Jerry Bernadini, dean of engineering, at 401-825-1189

Local apprenticeship options:

National Career Readiness Certificate level:

Silver

The NCRC is being piloted on a limited basis and may not apply to all employment situations.

Certifications:

See local training programs above

Licenses: None

Explore More Options

- Similar jobs:**
- Tool and Die Maker
 - Patternmakers, Metals and Plastic
 - Model Makers, Metals and Plastic
 - Machinists
 - CNC Tool Operators, Metals and Plastic
 - Electrical and Electronics Repairers, Commercial and Industrial Equipment
 - Manufacturing Production Technician
 - Mechanical Engineering Technicians
 - Electrical Engineer Technicians
 - Electronics Engineer Technicians

Find local jobs and internships: Visit the EmployRI job and internship search at <https://www.employri.org/jobbanks/>

Find jobs throughout the US: Visit the CareerOneStop job search at <http://www.careeronestop.org/JobSearch/>

Additional Job Details

- Tasks:**
- Determine the sequence of machine operations, and select the proper cutting tools needed to machine work pieces into the desired shapes
 - Revise programs or tapes to eliminate errors, and retest programs to check that problems have been solved
 - Analyze job orders, drawings, blueprints, specifications, printed circuit board pattern films, and design data to calculate dimensions, tool selection, machine speeds, and feed rates
 - Determine reference points, machine cutting paths, or hole locations, and compute angular and linear dimensions, radii, and curvatures
 - Observe machines on trial runs or conduct computer simulations to ensure that programs and machinery will function properly and produce items that meet specifications
 - Compare encoded tapes or computer printouts with original part specifications and blueprints to verify accuracy of instructions
 - Enter coordinates of hole locations into program memories by depressing pedals or buttons of programmers
 - Write programs in the language of a machine's controller and store programs on media such as punch tapes, magnetic tapes, or disks
 - Modify existing programs to enhance efficiency
 - Enter computer commands to store or retrieve parts patterns, graphic displays, or programs that transfer data to other media

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- Knowledge:**
- **Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications
 - **Mechanical** — Knowledge of machines and tools, including their designs, uses, repair, and maintenance

- **Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models
 - **Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
 - **Production and Processing** — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods
 - **Computers and Electronics** — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming
 - **English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar
 - **Education and Training** — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects
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Skills:

- **Programming** — Writing computer programs for various purposes
 - **Complex Problem Solving** — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions
 - **Monitoring** — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action
 - **Operation Monitoring** — Watching gauges, dials, or other indicators to make sure a machine is working properly
 - **Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
 - **Active Learning** — Understanding the implications of new information for both current and future problem-solving and decision-making
 - **Judgment and Decision Making** — Considering the relative costs and benefits of potential actions to choose the most appropriate one
 - **Mathematics** — Using mathematics to solve problems
 - **Reading Comprehension** — Understanding written sentences and paragraphs in work related documents
 - **Systems Analysis** — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes
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Abilities:

- **Near Vision** — Ability to see details at close range (within a few feet of the observer)
 - **Perceptual Speed** — Ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.
 - **Information Ordering** — Ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations)
 - **Problem Sensitivity** — Ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem
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- **Mathematical Reasoning** — Ability to choose the right mathematical methods or formulas to solve a problem
- **Oral Comprehension** — Ability to listen to and understand information and ideas presented through spoken words and sentences
- **Selective Attention** — Ability to concentrate on a task over a period of time without being distracted
- **Visualization** — Ability to imagine how something will look after it is moved around or when its parts are moved or rearranged
- **Control Precision** — Ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions
- **Flexibility of Closure** — Ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material

Technology:

- **Interacting with Computers** — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
 - Enter commands, instructions, or specifications into equipment
 - Program equipment to perform production tasks
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Mechanical Engineer



Job Overview

Sample job titles: Mechanical Engineer, Design Engineer, Product Engineer, Mechanical Design Engineer, Process Engineer, Equipment Engineer, Design Maintenance Engineer, Systems Engineer, Chassis Systems Engineer, Commissioning Engineer

Job summary: Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.

Job Outlook

RI median wage:	\$42.80/hr	National median wage:	\$39.47/hr
RI wages:	\$43.57-\$53.51/hr	National wages:	\$35.43-\$41.45/hr
RI percent change in jobs through 2020:	2%	National percent change in jobs through 2020:	3%-7%
RI job openings:	940/per year	National job openings:	99,700/per year
Is this a high-demand job?	Yes		

How to Prepare

Education: Bachelor's degree

Find local education and training programs through the Eligible Training Program Manufacturing list at <http://www.dlt.ri.gov/wio/ProgramsMfg.htm>

Contact the Manufacturing Industry Partnership for additional training programs or add on(s) that have not yet been identified.

- Contact: Chris Matteson, deputy director of Rhode Island Manufacturers Association,
- Phone: 401-345-5695
- Email: chrism@mfgri.com

Local training programs:

Mechanical Engineering

- Provider: URI Department of Engineering
- Type of certificate/degree awarded: Bachelor's degree
- Address: 203 Wales Hall, 92 Upper College Rd., Kingston, RI 02881
- Website: <http://egr.uri.edu/undergraduate-programs/>
- Contact: 401-874-2524 or mcise@egri.edu

Local apprenticeship options: None

National Career Readiness Certificate level: Silver-Gold
The NCRC is being piloted on a limited basis and may not apply to all employment situations.

Certifications: None

Licenses: None

Explore More Options

Similar jobs:

- Logistics Engineers
 - Aerospace Engineers
 - Electrical Engineers
 - Product Safety Engineers
 - Industrial Engineers
 - Validation Engineers
 - Photonics Engineers
 - Manufacturing Engineers
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Find local jobs and internships:

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Find jobs throughout the US:

Visit the CareerOneStop job search at <http://www.careeronestop.org/JobSearch/>

Additional Job Details

Tasks:

- Read and interpret blueprints, technical drawings, schematics, or computer-generated reports
 - Assist drafters in developing the structural design of products using drafting tools or computer-assisted design (CAD) or drafting equipment and software
 - Research, design, evaluate, install, operate, and maintain mechanical products, equipment, systems and processes to meet requirements, applying knowledge of engineering principles
 - Confer with engineers or other personnel to implement operating procedures, resolve system malfunctions, or provide technical information
 - Recommend design modifications to eliminate machine or system malfunctions
 - Conduct research that tests or analyzes the feasibility, design, operation, or performance of equipment, components, or systems
 - Investigate equipment failures and difficulties to diagnose faulty operation, and to make recommendations to maintenance crew
 - Develop and test models of alternate designs and processing methods to assess feasibility, operating condition effects, possible new applications and necessity of modification
 - Develop, coordinate, or monitor all aspects of production, including selection of
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manufacturing methods, fabrication, or operation of product designs

- Specify system components or direct modification of products to ensure conformance with engineering design and performance specifications
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Knowledge:

- **Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
 - **Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models
 - **Mechanical** — Knowledge of machines and tools, including their designs, uses, repair, and maintenance
 - **Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications
 - **Physics** — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes
 - **Production and Processing** — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods
 - **Computers and Electronics** — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming
 - **English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar
 - **Customer and Personal Service** — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
 - **Administration and Management** — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people
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Skills:

- **Complex Problem Solving** — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions
 - **Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
 - **Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times
 - **Judgment and Decision Making** — Considering the relative costs and benefits of potential actions to choose the most appropriate one
 - **Mathematics** — Using mathematics to solve problems
 - **Reading Comprehension** — Understanding written sentences and paragraphs in work related documents
 - **Science** — Using scientific rules and methods to solve problems
 - **Operations Analysis** — Analyzing needs and product requirements to create a design
 - **Active Learning** — Understanding the implications of new information for both current and future problem-solving and decision-making
 - **Speaking** — Talking to others to convey information effectively
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Abilities:

- **Information Ordering** — Ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
 - **Mathematical Reasoning** — Ability to choose the right mathematical methods or formulas to solve a problem
 - **Deductive Reasoning** — Ability to apply general rules to specific problems to produce answers that make sense
 - **Written Comprehension** — Ability to read and understand information and ideas presented in writing
 - **Near Vision** — Ability to see details at close range (within a few feet of the observer)
 - **Problem Sensitivity** — Ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
 - **Inductive Reasoning** — Ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events)
 - **Oral Comprehension** — Ability to listen to and understand information and ideas presented through spoken words and sentences
 - **Category Flexibility** — Ability to generate or use different sets of rules for combining or grouping things in different ways
 - **Number Facility** — Ability to add, subtract, multiply, or divide quickly and correctly
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Technology:

Using computer and computer systems (including hardware and software) to program, write software, set up function, enter data, or process information
