

Production Technician Academy Program Description

Program Overview:

The Production Technician Academy is a competency based training program designed to prepare graduates for successful, long term careers in manufacturing. U. S manufacturers have invested in cutting edge advanced technologies to produce high quality goods at costs that can compete with foreign made products. This new environment of automated machines, computer driven processes and integrated electronic systems offers an exciting career path for those with an interest and aptitude.

Employers need workers!

The units of study which make up each training module are presented in a sequence which assures a theoretical foundation and an opportunity to practice or observe the technology in use in the learning lab. The program combines lecture, demonstration, and laboratory exercises to facilitate learning. Safe work practices are stressed and consistently practiced. Industry leaders will guide and direct the entrance criteria and curriculum, which adjusts constantly to keep up with changes in technology.

Industry Expectations for Production Technicians

Production technicians must possess the skills, knowledge and competencies necessary to carry out the responsibilities assigned to the job. These include

- Maintain a safe and productive work area
- Maintain quality and implement continuous improvement processes
- Correct the product or process to meet quality standards
- Manufacture product to meet customer needs
- Maintain equipment, tools and workstations
- Communicate with coworkers and/or external customers to ensure production meets business requirements
- Recognize business financial imperatives
- Employ good personal ethical characteristics and behaviors

Candidates must be willing to work a variety of hours including holidays and weekends. They must be willing to work overtime. Technicians must also be able to keep up with the physical demands of the position, such as extended time standing, bending and stooping, lifting and exposure to noise.

Credentials Earned

This is a hands-on program which provides a full range of certified safety training and an opportunity to practice on the electrical and mechanical equipment in the lab. Professional tools are used throughout the course. Educational partnerships with industry provide students with unique industry exposure and hands on practice.

Graduates earn a Certificate of Completion from Kalamazoo Valley Community College based on written and practical examinations as well as adherence to the standards of the program. A transcript is awarded to each graduate documenting the specific competencies they demonstrate in the academy.

Admission to the Program

The Production Academy is a job training program. The opportunity to learn and demonstrate abilities coupled with the careful pre-screening for the talents and fit manufacturers require will result in a high likelihood of graduates being hired. Regional employers have provided advice and direction for establishing the admission criteria.

Applicants must possess a desire to work in a manufacturing environment. Production Technician positions require the ability to maintain a safe and productive work area, ensure quality standards are met, and to communicate with coworkers and customers to ensure production meets business requirements.

Applicants are required to have a High School Diploma or GED and must be at least 18 years old. This is a requirement for employment in the manufacturing industry.

Performance Assessment (ACT) and Math/Reading Assessment (WorkKeys). Applicants must possess personal and workplace behaviors and attitudes required of manufacturing employers as well as appropriate math and reading ability. Testing will be completed to measure aptitude for work in a manufacturing environment.

Through a **structured interview** technique we identify personal qualities that will contribute to success in the Production Technician Academy and success in manufacturing industry employment.

Applicants must have the ability to pass a drug test and criminal background screening. Certain felony offenses limit employment eligibility in the manufacturing field of work.

Program Content

The units which make up this Academy provide a foundational knowledge for the success as production technician in a manufacturing setting.

Advanced Manufacturing Industry Introduction: 16 hours

Participants will explore the modern manufacturing industry; industry sectors/regulations/business economics and the corporate and personal work ethics that are involved. Participants will tour the operation of a robust modern advanced manufacturing environment.

- Define Manufacturing
- List Manufacturing Sectors
- Describe the impact of regulations in a manufacturing environment
- Identify the organizational need for profit
- Describe the individuals role in the organizations Profit and Loss
- Identify good personal ethical characteristics and behavior
- Differentiate between good and poor business ethics
- Identify the Lean tools, teamwork, quality principles observed throughout the tour

Safety Training: 18 hours

American Heart Association Heart Saver First Aide - Participants will practice the basics of first aid, including the proper use of cardiopulmonary resuscitation (CPR) and defibrillation, and the appropriate ways to handle medical emergencies, including burns, cuts, choking, and environmental emergencies. AHA First Aid card issued.

- Assess medical situations and determine if first aid is necessary
- Describe the proper first aid techniques needed for medical emergencies
- Demonstrate when and how to administer CPR

- Describe when defibrillation would be necessary, and how it would be applied
- Possess valid AHA first aid card

OSHA 10 hour for General Industry - Participants will gain a basic understanding of the most important occupational safety and health compliance issues to General Industry as well as knowledge of the associated standards and regulations. Successful completion will result in an OSHA 10 hour Wallet card.

- Define a safe work environment
- Identify immediate and real costs of an accident
- Identify methods of preventing accidents in the workplace
- Assume responsibility for the personal safety of self and others
- Maintain a clean and safe work environment
- Demonstrate a positive personal attitude towards safety
- Comply with established safety practices
- Wear protective safety clothing as required
- Maintain and use protective guards and equipment on machinery
- Handle/store flammable materials appropriately
- Prevent spontaneous ignition by practicing proper waste disposal habits
- Interpret/display MSDS (Material Safety Data Sheet) as required
- Identify fire exits and fire-fighting equipment
- Report unsafe practices to appropriate personnel
- Operate equipment in a safe, prescribed manner
- Define different types of chemical, biological, and physical hazards
- Describe ergonomics and its importance to the manufacturing process

Lockout Tagout (LOTO)

Participants will practice general industry standards and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities as they relate to the standards for general industry

- Define lockout tagout
- Identify when LOTO is required
- Describe the difference between authorized employees and affected employees
- Demonstrate common lockout procedures?

Lean Manufacturing: 16 hours

Lean Simulation

Participants will simulate the activity of a Manufacturing Production company. Hands-on exercises teach the fundamental precepts of Lean Manufacturing through a manufacturing simulation workshop. Participants will discover the impact of Lean Thinking while learning and practicing Takt time, one-piece flow, JIT production, visual workplace, pull systems, work balance and continuous improvement.

- Identify the key lean concepts and why they are used
- Describe impact of Lean concepts to the manufacturing floor
- Learn how to apply lean techniques in a simulated manufacturing environment
- Tie together lean techniques with process flow improvements
- Demonstrate the ability to apply continuous quality improvement to manufacturing processes
- Maintain production according to instructions
- Explain the advantages and disadvantages of just in time inventory
- Locate and retrieve production materials specific to process flow and delivery schedule

Value Stream Mapping

Participants will identify the value stream of a product line and expose waste by revealing steps that are non-value added. The process will teach participants to see this stream. Participants will map an example of a current and future state process. The elimination of waste and the associated costs are outcomes that are addressed through the implementation of the future state map process.

- Explain where to use and how to create value stream maps

- Develop a current state map
- Visualize the flow of products and identify how Lean techniques will improve system performance
- Create a visual map to “see” waste
- Create a future state map with a lean plan to reach the future state that provides improved quality, lower cost, and reduced lead time
- Identify where lean tools can be used, such as Kanban, Supermarkets, One Piece Flow, Leveling
- Utilize the value stream mapping tool on any manufacturing process

Lean 5S

Participants learn a process and method for creating and maintaining an organized, clean, high-performance workplace where abnormalities are visible and obvious. The course will take participants through each “S”; Sort, Straighten, Shine, Standardize, and Sustain, in a logical approach to improve performance in a manufacturing area. The participants will recognize waste within a manufacturing environment and create countermeasures using 5-S principles to eliminate or reduce the wasteful activity.

- Describe the 5S process and how to apply it to maintain a high performance work area.
- Demonstrate the ability to leverage 5S tools to eliminate waste in the workplace lab
- Identify how 5-S principles improve performance and quality

Team Workgroup Participation: 8 hours

Participants will learn the importance of working together as a team to accomplish the goals of their organization. Participants will also be equipped with an understanding of the traits of successful teams and tools that foster teamwork and communication.

- Identify different types of work teams
- Describe the traits of successful teams
- Describe the role of an individual on a team
- Define the role of a team leader
- Identify the stages of team development
- Describe how to address concerns and conflict in a team environment
- Demonstrate effective teamwork skills during lab application exercises

Applied Math Fundamentals: 16 hours

Participants will be equipped with the basic arithmetic skills to be successful in a production role in a manufacturing environment. Participant will have a basic understanding of problem solving through computations with whole numbers, fractions, decimals, ratios, percents and the ability to implement the appropriate order of operation.

- Apply basic math functions to solve workplace problems
- Calculate percentage, rate, ratio, decimal and proportion with and without the use of a calculator
- Create and interpret basic graphs and charts commonly used in manufacturing

Industrial Blueprint Reading: 15 hours

Participants will learn drafting and blueprint reading procedures, alphabet of lines, auxiliary views, assembly drawings, title blocks, drawing changes and standard symbols. Emphasis is placed on actual industrial conditions and hands-on applications.

- Define basic blueprint terminology
- Identify different types of dimensions
- Identify general note symbols
- Interpret commonly used abbreviations and terminology
- Determine tolerances associated with dimensions on a drawing
- Identify types of lines within a drawing
- List the essential components found in the title block
- Identify orthographic views
- Identify positions of views: top, front, side, auxiliary, section
- Determine the scale of the view or section
- Check for revisions
- Select and use appropriate measurement techniques and instruments
- Describe measurements' role in manufacturing

- Distinguish between direct and calculated measurements
- Explain calibration requirements of various precision instruments
- Illustrate measurement differences when taken with calibrated and non-calibrated instruments
- Match appropriate measurement tools with various types of measurement requirements
- Demonstrate proper measurement tool usage
- Convert between US and metric measurement systems
- Convert fractional measurement to decimal measurement
- Interpret results of measurements and calculations
- Distinguish between general and precision measurement
- Distinguish between US and metric measurement systems
- Identify influences of a quality system on specific manufacturing processes
- Explain the effect of quality on profit
- Identify the effects of continuous quality improvement
- Identify customer problems
- Determine causes of the problem
- Apply problem-solving system
- Recommend possible solutions
- Develop a plan utilizing a selected quality control system
- Evaluate process selected versus desired goals

Precision Measurement: 15 hours

Participants will be able to use precision and semi-precision instruments to inspect part dimensions and functional test requirements. Participants will understand the relationship between dimensional metrology and the quality. Participants will be able to demonstrate a working knowledge of basic concepts of dimensional metrology as they apply to terminology, methodology and application of common measuring instruments used for inspection of part dimension and functional test requirements. Participants will be able to perform simple calibration checks and the setting of measuring instruments.

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Quality Management: 12 hours

Participants are introduced to the Quality Management Systems available to organizations to ensure the organization consistently meets or exceeds customer expectations. The course focuses on process measurement and controls as means of continuous improvement.

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Statistical Process Control: 12 hours

Participants will learn the principles and application of statistical process control tools as commonly used on the shop floor. Participant will determine when SPC is appropriate, what type of SPC tool should be used in a particular situation, and how to monitor the process and interpret the results. Simple problem solving and data analysis techniques will also be applied.

- Define SPC
- Identify the relationship between SPC steps and specific production processes
- Analyze production specific processes
- Collect, analyze and interpret process test data for compliance to specifications
- Improve production process (if indicated by analysis of data)
- Demonstrate the ability to apply SPC techniques in the workplace.

Root Cause Analysis/Problem Solving: 8 hours

Participants will practice analytical problem-solving thinking and develop skills to apply the structured 8-D Corrective Action approach at the individual and team level.

- Discuss the use of problem solving tools (e.g., Fishbone diagrams, why-why analysis, IS/ IS-NOT)
- Identify the benefits of the team approach to problem solving
- Follow the structured problem solving process utilizing the 7-D and 8-D problem solving process
- Determine the usefulness of statistical tools for investigation and corrective action verification
- Report on their team's findings from their investigative research and corrective actions.

Basic Mechanical: 8 hours

Participants will learn the fundamental principles of safe mechanical work practices, methods of maintaining and troubleshooting mechanical plant equipment and the competencies needed to recognize and report worn part conditions.

- Demonstrate basic mechanical skills
- Identify and report equipment malfunctions
- Follow established safety procedures when around machinery/equipment
- Use a systematic team problem solving approach
- Develop and use a safety checklist
- Follow cleanliness standards
- Describe the concept of action/reaction
- Identify pinch and shear points
- Identify potential energy sources
- Describe importance of sprocket and chain alignment
- Describe safety issues related to chain and sprocket alignment
- Explain why there is a difference in importance between belt alignment and chain alignment Evaluate mechanical timing issues
- Determine difference and similarities between mechanical and electronic timing
- Identify the action/reaction relationships that effect timing
- Apply critical thinking methodology to timing systems
- Evaluate components that are worn and interpret the effects on related systems

Basic Electrical: 8 hours

Participants will learn how to safely run, identify and troubleshoot the electrical components and power sources that operators routinely encounter on a manufacturing line.

- Identify and explain basic electrical components and their interactions.
- Demonstrate where the electrical switches and sources are on the manufacturing line, given the proper diagrams for different sources of electricity.
- Identify where the electrical panel is for the manufacturing line.
- Identify basic electrical components and their interaction in a circuit
- Recognize different over currents, such as short circuits, ground faults and overloads.
- Utilize troubleshooting guidelines to identify which components of the manufacturing line will cause a power outage and what to do in case of a power outage.

- Use Safety guidelines to follow the safety rules and regulations surrounding the electrical components of the manufacturing line.
- Describe techniques to help prevent failures of electrical components
- Effectively communicate line malfunction issues with an Electrician

Introduction to Programmable Logic Control: 4 hours

Participants will learn what a PLC is, observe its operation, usage, applications, hardware selection, configuration and be introduced to programming examples and troubleshooting techniques.

- Describe how a PLC functions
- Identify, define key PLC terminology
- Describe different types of signals that go into a PLC
- Describe how to troubleshoot a simple control system that uses a PLC
- Identify how to prevent common, simple PLC and instrumentation failures.

Basic Industrial Fluid Power: 4 hours

Participants will study basic fluid power laws and principles, force, work and power as related to fluid power, the differences/similarities between pneumatic, hydraulic and vacuum systems.

- Identify the purpose and advantages of a fluid power system.
- Identify the compressibility/non-compressibility of gases and liquids.
- Read and report pressure and vacuum gauge scaling in psig, bars, in Hg and mm Hg.
- Determine the best operating range for gauges.
- Identify the construction type and explain the operating principles of various types of directional control valves.
- Demonstrate the application of force, work and power as applied to fluid power.
- Evaluate and report pressure gauge conditions in a fluid power system under operating conditions; fluid flow at various loads and under dead head conditions.
- Identify the conditions necessary to develop pressure in a column of fluid.
- Identify the conditions necessary to develop a vacuum in a fluid power system.
- Diagnose problems with fluid power systems and recommend preventative or corrective actions.

Job Search and Interviewing: 16 hours

Participants will apply effective resume writing and interviewing techniques in preparation for a Manufacturing Entry level position. Resume writing and interview coaches will work directly with participants.

- Develop personal professional resume that effectively communicates skill, education and experience that support success in advanced manufacturing environment
- Demonstrate effective interview communication skills to enable the participant to articulate their knowledge, skill and experience as they relate to the advanced manufacturing environment.

Computer Usage Integration:

Use of computers will be integrated into various modules.

- Able to start windows based program
- Create, save, open and edit documents using Microsoft Word
- Read and compose email
- Enter time records in an on-line system
- Use the internet to open web sites.

Total Contact Hours: 176