



# **MH Technologies LLC**

## **2023 Course Catalog**

**Training for Safe, Smart and Productive  
Manufacturing**

## About MH Technologies

MH Technologies is a woman-owned small business founded in 2009 that specializes in providing training services to the manufacturing world by leveraging a large staff of highly credentialed and field-tested instructors. Our services range from instructional program design, course delivery, course development to program administration. In today's fast paced global economy, the importance of employee training, product support and workforce readiness are becoming a vital part of a company's success. As a provider of training and support services with such a vast amount of experience, MH Technologies can craft highly customized solutions tailored to a company's unique needs or to provide an "off the shelf" solution to support an organization's entire needs.

*All courses within this catalog represent our standard course content and length. Each can be customized to meet the specific needs of any business or educational institution.*

*The courses included in this catalog can be combined to create complete programs or short workshops for building workforce "bootcamps" or for training new employees.*

***Examples on page 18***

*This catalog is not representative of all our offerings. Please contact us with special training requests and courses not represented within this catalog.*

***Contact info below***

*Equipment for most courses within this catalog can be provided upon request for an additional cost.*



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## Manufacturing Essentials

<b>Industrial Shop Math</b>	This course is designed to provide an understanding of mathematics used in shop work. Course topics include decimals, fractions, tolerances, English/metric conversions, trigonometric functions, and basic algebra, as well as use of scientific calculators.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> none	

<b>Blueprint Reading</b>	This course will provide students the basic skills needed for understanding the language of technical drawings or blueprints. Through lecture and hands on exercises, participants will learn about drawing areas, the alphabet of lines, Orthographic Projection on multiple view drawings, additional drawing views including section, auxiliary and detail views as well as dimensions and tolerances, and thread callouts.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

<b>Geometric Dimensioning &amp; Tolerancing – GD&amp;T</b>	This course will provide students with a fundamental understanding of Geometric Dimensioning and Tolerancing (GD&T). Students will learn GD&T symbols and rules, identify form, orientation, location, runout, and profile controls, and understand material condition. Students will also define datums and interpret a feature control frame to understand what is being controlled and to what extent. Emphasis is placed on the communication that GD&T provides.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> Blueprint Reading (or equivalent experience)	

<b>Metrology</b>	This course will provide students with basic skills and an understanding of the science of measurement critical at each stage of manufacturing from design to the finished product. The course will cover scales, height gages, micrometers, and calipers, in addition to an introduction to gage blocks, go/no-go gages and the principles of coordinate measuring machine operation.
<b>Length:</b> 8 Hours	
<b>Prerequisites:</b> Shop Math (or equivalent experience)	

## Workplace Safety

<b>OSHA 10</b>	This course covers basic industrial safety. It is designed to provide the trainees with an understanding of OSHA, its history, how to find and read OSHA standards, and understanding your rights as a worker. Topics include an Introduction to OSHA, Walking and Working Surfaces, Fire Safety, Electrical Safety, Personal Protective Equipment (PPE), and Hazard Communications. Other topics may include such things as Machine Guarding, Confined Space Safety, Forklift Safety, Lockout/Tagout, or other topics relevant to the client's needs. Upon successful completion of this training course, participants will receive an OSHA 10 course completion card.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	
<b>Length:</b> 30 Hours	
<b>Prerequisites:</b> None	

<b>OSHA 30</b>	This course expands on the 10-hour General Industry training and covers the required topics necessary to obtain the OSHA thirty-hour General Industry course completion card. The course is comprised of 25 sections and covers topics pertaining to regulations covered by OSHA standards in 29 CFR 1910. Topics covered include topics in the OSHA 10-hour training along with additional topics such as Hazardous Materials, Bloodborne Pathogens, Welding, Cutting and Brazing Safety, Industrial Hygiene, Safety and Health Programs or other topics relevant to the client's needs.
<b>Length:</b> 30 Hours	
<b>Prerequisites:</b> None	

<b>Confined Space</b>	This course is designed to help students understand, recognize, and prevent health hazards associated with confined space entry. The course provides an understanding and recognition of confined space hazards, instrumentations used to evaluate atmospheric hazards, ventilation techniques, entry permits, isolating the space, working in the space, and evacuating the space.
<b>Length:</b> 8 Hours	
<b>Prerequisites:</b> None	

<b>Confined Space - Entry/Attendant/Supervisor</b>	This course covers OSHA's standard for confined spaces (29 CFR 1910.146). This standard contains the requirements for practices and procedures to protect employees in general industry from the hazards of entering permit spaces. Confined Space Entry/Attendant/Supervisor level training instructs students about the hazards of limited or restricted means of entry or exit.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>Lockout/Tagout</b>	This course is designed to provide students an understanding of the OSHA Lockout/Tagout standard 1910.147. Through lecture and hands on exercises, the learners will understand the importance of LOTO in allowing them to work safely with equipment where unexpected start-up or movement could create a hazard. Using hands-on exercises and case studies, the trainees will understand the OSHA Lockout/Tagout regulation 1910.147 principles, when LOTO is required, and the proper steps to perform an effective lockout on a piece of equipment.
<b>Length:</b> 8 Hours	
<b>Prerequisites:</b> None	

<b>Basic Safety - Electrical</b>	This course is a safety course for participants who are new to electrical or have little knowledge of electrical circuits and the hazards of electricity. Topics investigated are: What is electricity? Conductors, Insulators & Semiconductors. Safety-related workplace practices. What causes an electrical arc? What is flashover? Personal Protective Equipment & Arc Flash related topics.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

## Industrial Automation

<table border="1"> <tr> <td><b>PLC &amp; Communication Devices</b></td> <td rowspan="3">This course is designed to provide participants with PLC fundamentals. The course provides an understanding of PLC circuits, hardware, and applications. Course topics include PLC instructions, hardware, communication devices, and troubleshooting navigation of PLC controller software and components. Upon completion of this module the trainees will be able to demonstrate knowledge of the operation and programming of PLC's also demonstrate knowledge of the installation and troubleshooting of PLC's and communication devices.</td> </tr> <tr> <td><b>Length:</b> 80 hours</td> </tr> <tr> <td><b>Prerequisites:</b> None</td> </tr> </table>	<b>PLC &amp; Communication Devices</b>	This course is designed to provide participants with PLC fundamentals. The course provides an understanding of PLC circuits, hardware, and applications. Course topics include PLC instructions, hardware, communication devices, and troubleshooting navigation of PLC controller software and components. Upon completion of this module the trainees will be able to demonstrate knowledge of the operation and programming of PLC's also demonstrate knowledge of the installation and troubleshooting of PLC's and communication devices.	<b>Length:</b> 80 hours	<b>Prerequisites:</b> None
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<table border="1"> <tr> <td><b>Siemens Simatic S7 PLC Programming</b></td> <td rowspan="3">This course provides participants the ability to program using STEP7, program structures, system functions, and custom block design. STEP7 engineering tools and programming instructions guide the student through realistic applications.</td> </tr> <tr> <td><b>Length:</b> 40 Hours</td> </tr> <tr> <td><b>Prerequisites:</b> None</td> </tr> </table>	<b>Siemens Simatic S7 PLC Programming</b>	This course provides participants the ability to program using STEP7, program structures, system functions, and custom block design. STEP7 engineering tools and programming instructions guide the student through realistic applications.	<b>Length:</b> 40 Hours	<b>Prerequisites:</b> None
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<b>Length:</b> 40 Hours				
<b>Prerequisites:</b> None				

<b>Omron PLC 2</b>	Omron PLC 2 is a more advanced class for students with PLC experience or who have been through the Level 1 class. This course covers more advanced PLC instructions and troubleshooting navigation of PLC controllers' software and components.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Omron PLC 1	

<b>HMI Programming</b>	This course is designed to provide the skills in HMI fundamentals. The course provides an understanding of HMI functions hardware and applications. Course topics include PLC to HMI instructions, hardware, HMI graphics, and creating troubleshooting messages displayed on HMI.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>RFID for Manufacturing</b>	This course is designed to teach the student the installation, programming, and operation of Radio Frequency identification Systems (RFID) used in manufacturing plants.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>Automated Systems Troubleshooting - Capstone</b>	This course covers system level training and integration fundamentals. Course topics include electrical schematics combined with integrated PLC, mechanical systems, fluid power systems and welding systems.
<b>Length:</b> 40	
<b>Prerequisites:</b> Advanced PLC, Electrical Fundamentals, Robot Operation & Programming (or equivalent experience)	

<b>Fluid Power (Pneumatic/Hydraulic)</b>	This course provides students with an understanding of fluid power symbols, laws, equipment, formulas for fluid power calculations and maintenance procedures for fluid power systems. Students learn to read schematics, interpret pneumatic symbols, and get hands-on with pumps, control valves, actuators and other fluid power components while using a bill of materials to build, test and troubleshoot multiple fluid power systems.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

## Electrical & Electronics

<b>Electrical Fundamentals</b>	This course covers the basics of DC (direct current) and AC (alternating current) theory and fundamentals. Course topics include concepts of electrical schematics, components, voltage, current and resistance. Ohms Law is used extensively to verify the results obtained from the outcomes of the lab experiments. Power supplies and test equipment like the digital volt Ohm meter will be operated to make observations of circuit parameters and operation.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Shop Math (or equivalent experience)	

<b>Electrical Fundamentals [No Math]</b>	This course emphasizes electrical concepts for individuals having little to no knowledge of electrical circuits. Students take the following measurements using a digital voltmeter: Alternating & Direct Current voltages., Alternating and Direct Current Amperages, checking diodes, checking continuity, measure resistance, using AC & DC power sources individuals will construct electrical circuits from AC & DC wiring diagrams.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>Motor Control &amp; Drives</b>	This course is designed to provide basic skills in motor control operations. Participants will build and learn how relay logic circuits operate in motor control circuits. Participants will operate and gain an understanding of AC / DC motor operations, control circuit components, Star and Delta configured motors, ladder diagrams, and interpretation of electronic motor control schematics. VFD operation, wiring, and programming is imbedded into course content.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Electrical Fundamentals (or equivalent experience)	

<b>Digital Electronics</b>	This course covers the fundamentals of digital electronics and troubleshooting digital circuits. Course topics include logic gates, Boolean expressions, and schematics for logic gates, inverters, digital electronic circuits and troubleshooting analysis.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Electrical Fundamentals (or equivalent experience)	

<b>Electronic Sensors</b>	This course introduces participants to the most common types of sensors and boundary ranges of sensors. Participants learn adjusting and alignment, sinking and sourcing along with NPN and PNP types of sensors. Labs include application of terminology, schematic symbols, and methods of bench testing a wide range of sensors.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Electrical Fundamentals (or equivalent experience)	

<b>Electrical Print Reading</b>	This class is designed around an individual that has some knowledge of electrical concepts and use of a DVM (digital voltmeter), also some identification with basic electrical components. Schematic symbols will be introduced as they appear on actual wiring diagrams. Pictures as well as illustrations of typical control devices will be introduced along with associated equipment. The student will operate a DC Power Supply, & build relay logic circuits of various common control circuits. Some of these circuits include start stop, limits, control, safety and holding.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Familiarity of electrical components (or equivalent experience)	

<b>Electrical Maintenance</b>	This class is designed for current or new maintenance personnel that have some familiarity of electrical circuits and wiring. Some of the topics include, NEMA, identifying electrical components from their symbols, measuring resistance, checking cables using a continuity function of a DVM, series – parallel – combinational circuit wiring, remote operations of servo motors, and proximity sensor testing along with replacement and alignment.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Some familiarity of meter usage, and electrical circuits	



<b>Variable Frequency Drive Training [VFD]</b>	This course is for individuals having little to no experience of VFD operations. Participants will learn VFD systems and associated components, wiring, fusing, and programming. Topics include the warnings associated with VFD's, navigating the operator keypad functions, input and output voltage connections, field wiring done by technicians, parameter summary & descriptions, & default values. Some of the programming involves the following adaptations. Motor voltage, motor base frequency's, base RPM's, acceleration time, deceleration times, skip frequency bands, resetting parameters to default values & Coast-to-Stop deceleration. <b>[Often paired with "All About Motors" Class]</b>
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> Familiarity of basic wiring standards and meter usage	

<b>All About Motors</b>	In this class participants will learn about the most common types of motors used in industry. The motors that will be studied will be single phase and three phase type. Single phase motors will be connected to operate in 120 volt and 240-volt configurations and reversed. Different three phase motors will be configured for 240-volt (Delta) and 480-volt (Star) operation. Test equipment will be introduced to measure voltages, currents, winding resistances, & phase checking.
<b>Length:</b> 8 Hours	
<b>Prerequisites:</b> Familiarity of basic motor wiring and use of a DVM	

<b>IPC J-STD 001 Theory Test Prep Class</b>	This course is designed to provide students the knowledge of the Soldered Electrical and Electronic Assembly standards. This course explores materials, methods, and verification criteria for producing high quality soldered interconnections. This standard emphasizes process control and sets industry consensus requirements for a broad range of electronic products. This is a comprehensive, knowledge-based series of modules which introduce students to the methods and procedures presented in the JSD -001 document. Students will be guided by the instructor in locating answers to questions associated with the open and closed book certification tests. It is designed for those new to the electronics industry. The class is 100% classroom lecture. Individuals who complete the class successfully will have the skills to pass the two tests, (open & closed book) needed to obtain a J – STD001 (CIS) "Certified IPC Specialist" certification.
<b>Length:</b> 32 Hours	
<b>Prerequisites:</b> None	

<b>IPC Soldering J-STD 001 Prep Class</b>	This class introduces the student to hand soldering techniques and soldering knowledge. It is designed for those new to the electronics industry. The class is 90% hands on skills development. Students will demonstrate soldering skills using lead/lead free solder as used in manufacturing. Individuals who complete the class successfully will have the skills to accurately solder, assemble and inspect electronic components, & printed circuit boards. IPC guidelines are imbedded within class activities that include requirements for acceptable interconnections of electronic components, printed circuit boards, and sub-assemblies. During the class the student will solder on an actual IPC practice board, and as a final solder on a certification board just as in the J-STD-001 Certification Class.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> Prior experience with hand soldering	

<b>IPC Soldering Boot Camp</b>	This class introduces the student to hand soldering techniques and soldering knowledge. It is designed for those new to the electronics industry. The class is 25% classroom lecture and 75% hands on skills development. Students will demonstrate soldering skills using lead/lead free solder as used in manufacturing circuit boards. Individuals who complete the class successfully will have the skills to accurately solder, assemble and inspect electronic components, printed circuit boards, cables and harnesses, and sub-assemblies. IPC guidelines are imbedded within class activities that include requirements for acceptable interconnections of electronic components, printed circuit boards, and sub-assemblies.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>IPC J-STD-001 Training–Operator</b>	This course is designed to teach students the requirements for Soldered Electrical and Electronic Assemblies standards. The course covers the materials, methods, and verification criteria for producing high quality soldered interconnections. The standard emphasizes process control and sets industry consensus requirements for a broad range of electronic products. IPC’s J-STD-001 Operator Proficiency Series is a comprehensive, knowledge-based series of modules that certify students to the methods and procedures presented in the J-STD-001 document. Designed for operators, the program assists workers with interpreting the J-STD-001 specification through lecture, demonstration, and labs.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>Wire Harness Design, Manufacture &amp; Troubleshooting</b>	This class is designed for a broad range of electrical manufactures and their products. The class begins with wiring harness diagrams and associated symbols. Pin board assembly techniques are discussed in detail with the importance of mass-producing wire harnesses. IPC wiring standards for wiring harnesses [WHMA-620] is discussed as a reference to industry standards. Soldering basics are practiced & PPE is discussed and practiced along with lead/lead-free solder guidelines. Labs are imbedded into the course to include, terminal lug soldering and sanctioned IPC splices. Cable harness abnormalities along with wiring harness assembly processes are discussed along with quality control. Participants construct an actual working cable harness and test it with a continuity checker before applying power to the cable.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>Panel Build Technician</b>	In this class, students learn the correct procedures for building a panel using safe and approved methods. Participants use drawings and wiring diagrams to assemble the panels, check for defaults during the build period, and learn how to take suitable action to remedy defects. Students use several approved methods of diagnosing faults demonstrating the correct use of test equipment.
<b>Length:</b> 32 Hours	
<b>Prerequisites:</b> Experience with basic wiring, hand tools and DVM meter usage	

<b>Understanding Ladder Diagrams</b>	Every piece of equipment (no matter how simple or complex) will have a wiring diagram. Understanding how the components of a circuit are connected requires skill in reading circuit schematic diagrams, sometimes called ladder diagrams. In this class students will wire up 25 to 30 common relay logic circuits and prove their operation. They will also troubleshoot circuit faults the instructor has put into a wired circuit. The wiring the students learn in this class will help them in understanding PLC field troubleshooting and wiring. Students also practice field upgrades (adding a new function to circuit operation) on some circuits.
<b>Length:</b> 32 Hours	
<b>Prerequisites:</b> Experience with basic wiring and DVM usage	

## Robot Programming

<b>FANUC Robot Operations &amp; Programming</b>	This course is designed to provide the basic skills needed to operate and program Fanuc Robots. Course topics include Robot Safety, Setup, Teach Pendant Controls and Programming. Upon completion of this course the trainees will have the knowledge and skills to safely program and operate an industrial robot.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>FANUC Robot Advanced Operations &amp; Programming</b>	This course is designed to provide the advanced skills for operating and programming Fanuc Robots. Course topics include collision guard, condition monitor function, multi-tasking, program shift utility and systems operations. The course provides both classroom and hands-on training in the use of advanced controls, operations, and part programming.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Robot Operations & Programming (or equivalent experience)	

<b>FANUC Robot Electrical Maintenance &amp; Troubleshooting</b>	This course is designed to provide an understanding of the Fanuc controller, its main components and to diagnose and repair the robotic electrical system. The instructor will insert faults into the controller and/or robot, and have the students find and repair the faults.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Robot Operations & Programming (or equivalent experience)	

<b>FANUC iRVision 2D</b>	This course is designed to provide the basic tasks and procedures required to set up, teach, test, and modify iRVision applications on an R-30iA Robot Controller. The trainee will understand general vision concepts including camera setup, lighting, lensing, 2D Single and 2D Multiple View Process and perform hands on programming with industrial vision systems.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Robot Operations & Programming (or equivalent experience)	

<b>FANUC PaintTool Programming &amp; Operations</b>	This course teaches tasks and procedures that an operator, technician, engineer, or programmer needs to set up and program a FANUC robot using the FANUC Robotics PaintTool Application software package. The course consists of lectures, demonstrations, and a series of lab exercises designed to reinforce student learning. Recommended safety procedures are integrated into all training exercises.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>FANUC ROBOGUIDE HandlingPro</b>	This course is designed to provide the skills needed for creating a computer 3D simulated robotic workcell using FANUC ROBOGUIDE. This course is designed for application engineers who need to design robot workcells, perform cycle time, reach ability studies, or generate robot paths. This course will provide procedures for creating a HandlingPro virtual workcell. When completed, the workcell created will contain a FANUC robot with end-of-arm tooling, one or more fixtures for holding a part and a robot TPP Program which moves the part from one fixture to the next.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>FANUC Dispense Robot</b>	This course is designed to provide the students with a basic understanding of the operation, programming and maintenance of the robot dispense controller along with proper sealant applications and sealant properties. Through lecture and hands on exercises, students will gain an understanding of how dispense systems work and the advantages they provide.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Robot Operations & Programming (or equivalent experience)	

<b>ABB Robot Operations &amp; Programming</b>	This course provides participants with the ability to program and operate an ABB robot. The course is a combination of lecture and hands-on training and is custom-tailored to a specific software, controller, and robot. Identification of the software and controller is needed prior to training. Upon completion of this module the trainees will have the knowledge and skills to safely program and operate an ABB industrial robot.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>Motoman Robot Operations &amp; Programming</b>	This course is designed to provide the basic skills needed to operate and program Yaskawa Motoman Robots. Course topics include Robot Safety, Setup, Controls and Programming. Upon completion of this module the trainees will have the knowledge and skills to safely program and operate an industrial robot.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

## Robot Mechanical

<b>Robot Mechanical Teardown</b>	This hands-on course provides participants the ability to follow detailed procedures necessary for complete disassembly, inspection, and reassembly of a FANUC robot mechanical unit. Participants will learn rigging, preventive maintenance, how to replace parts and to master the robot.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Robot Operations & Programming (or equivalent experience)	

<b>Rigging for Robot Mechanical Teardown</b>	This course is designed to provide the skills in rigging while tearing down a robot. The course provides an understanding of rigging safety and equipment used in rigging applications. Course topics include rigging gear, inspection, load calculations, and manipulating equipment moves. Upon completion of this module the trainees will understand basic OSHA principles, rigging safety and inspection, rigging components and terminology, and rigging fundamentals.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

## Machining

<b>Machining Essentials</b>	This course is designed to provide basic knowledge of manual machining equipment including grinders and sanders, drill press, lathes, and mills. Course topics include safety, speeds and feeds, drill press operation, grinder operation and saw operation.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Shop Math/Blueprint Reading (or equivalent experience)	

<b>Machine Tool</b>	This course is designed to provide the skills in machine tool functions and applications. Students learn to operate machine tool equipment including drill press, band saw, mill, and engine lathe. Course topics include safety, speeds and feeds, engine lathe equipment operation, cutting tools, milling operation, and band saw and drill press operation.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Shop Math, Blueprint Reading (or equivalent experience)	

<b>Machinist's Handbook Overview</b>	This course is designed to provide an understanding of how to effectively use the Machinery's Handbook (Pocket Companion). The course provides an understanding of the handbook and how to find needed information. Topics include Table of Contents, Index, Tapers, Threads, Material Properties, and Tooling.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Shop Math, Blueprint Reading (or equivalent experience)	

<b>CNC Milling Programming &amp; Set-up</b>	This course is designed to provide a basic understanding of CNC programming and set-up of a CNC Milling Machine. Upon completion of this course the trainees will have knowledge of the proper structure and execution of CNC milling programs. Trainees will be able to upload programs, load tooling, make tool and fixture offsets and run a CNC program. This program includes hands-on experience on a CNC vertical machining center.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Math, BP Reading, GD&T (or equivalent experience)	

<b>CNC Lathe Programming &amp; Set-up</b>	This course is designed to provide a basic understanding of CNC programming and set-up of a CNC Lathe. Upon completion of this course the trainees will have knowledge of the proper structure and execution of CNC Lathe programs. Trainees will be able to upload programs, load tools, make tool offsets and run a CNC program. This module will include a hands component on a CNC Lathe.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Math, BP Reading, GD&T (or equivalent experience)	

<b>Mastercam</b>	This course teaches participants how to use Mastercam software to create 2D or 3D geometry and CNC programs, the navigation of the menus, importing/exporting of files, drawing functions, toolpath creations and posting options.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Math, BP Reading, GD&T, CNC (or equivalent experience)	

<b>SolidWorks</b>	In this course, participants learn to use the SolidWorks mechanical design automation software to build parametric models of parts and assemblies and how to make simple drawings of those parts and assemblies. This course is not designed to provide a deep understanding of this very robust program. The focus of this course is on the fundamental skills and concepts central to the successful use of SolidWorks 2009.
<b>Length:</b> 32 Hours	
<b>Prerequisites:</b> Windows, Software Tutorials 1-3	

<b>AutoCAD</b>	This course is designed to provide an understanding AutoCAD from simple fundamentals to advanced design. Course topics include basic commands, using layers, inserting blocks, editing drawings and text and dimensioning.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Working knowledge of basic design/drafting procedures and terminology	

## Quality

<b>Statistical Process Control [SPC]</b>	This course will instruct the participants in process improvement and variation reduction using Statistical Process Control (SPC). SPC identifies special causes of variation and other non-normal processing conditions so the operator can bring the process under statistical control and reduce variation. The course will address the purpose and role of SPC and the application of variable and attribute charts, calculation of control limits, process capability, Cp, Cpk, Pp, Ppk, and special statistical applications in the everyday working environment.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> Shop math (or equivalent experience)	

<b>Measurement System Analysis [MSA]</b>	This course is an activity-based workshop to teach fundamentals of process control from a design engineering standpoint and how to apply it to product, process, and measurement systems. Participants will use a series of activities to learn and apply tools and techniques associated with process control.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

<b>Kaizen Methodology &amp; Tools</b>	This class will examine basic elements of the Kaizen philosophy and methodology, discussing key elements and important prerequisites for a successful implementation of Kaizen. Participants will examine key elements of the Kaizen philosophy and methodology, introducing a structured step-by-step process, that if understood, followed, and implemented, will yield powerful results for the organization.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>8D Problem Solving</b>	This activity-based course helps class participants learn to apply this problem-solving approach typically employed by quality engineers and other professionals. The approach establishes a permanent corrective action based on a statistical analysis of the problem and focuses on the origin of the problem by determining its root causes. Participants learn how to identify, correct, and eliminate recurring problems.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

<b>Lean Manufacturing</b>	This course is designed to introduce the student to Lean Manufacturing including what Lean is and its history. Through lecture and activities, the student will learn about Lean processes, as well as Lean tools and concepts to establish current state and future state, and to build a Lean culture.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>5S/6S Foundation for Excellence</b>	This course showcases the power and utility of the 5s/6s strategy to improve workplace organization, cleanliness, and safety. This is not just a methodology; it is a culture that must be built into any organization which aims for continuous improvement of safe working environments and working conditions. Participants learn to maintain and continually improve workplace organization, cleanliness & safety. Students will complete a variety of hands-on lessons to assist with 5s/6s implementation in their workplace.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

<b>Six Sigma Yellow Belt</b>	This course is intended for anyone charged with improving performance. Yellow Belts play a vital role in a company's efforts to improve customer satisfaction and overall outcomes, such as quality, reducing errors and improving the bottom line. Participants can expect to be fully engaged while learning and applying principles, tools, and techniques of a Six Sigma Yellow Belt.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>Six Sigma Green Belt</b>	This course is intended for individuals charged with improving process performance. It is intended to teach a structured approach to improve the quality of products & services, outcomes, and the bottom line by identifying and removing the causes of defects (errors), minimizing variability, and improving workflow in business processes. Participants can expect to be fully engaged while learning and applying principles, tools, and techniques for completing breakthrough improvement projects. Participants are expected to complete a work-related project as part of this course.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> Six Sigma Yellow Belt (or equivalent experience)	

## Manufacturing Production

<b>Manufacturing Processes</b>	This course is designed to provide the understanding of the different manufacturing processes. The course provides an understanding of types of production, materials, production processes, including casting, molding, forming, machining, finishing and assembly. Students will gain knowledge of cellular and discrete manufacturing.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> Shop Math (or equivalent experience)	
<b>Welding</b>	This course is designed to provide basic safety and technical skills to individuals with little or no experience in welding. All completed weld assignments will be visually inspected to the appropriate American Welding Society (AWS) code depending on materials used. All appropriate destructive tests will be utilized to evaluate assignments.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	
<b>Welding and Fabrication</b>	This course is designed to provide the skills in GMAW, GTAW, SMAW and Oxyfuel cutting and welding. The course provides an understanding of safe welding practices, welding equipment setup and operation. Upon completion of this module the trainees will be able to safely set-up welding equipment with fundamentals of metals, alloys, oxyfuel, gas metal arc, gas tungsten arc.
<b>Length:</b> 80 Hours	
<b>Prerequisites:</b> None	
<b>Sheet Metal Basics</b>	This course will provide trainees with an understanding of sheet metal basics including basic shop safety, sheet metal safety, sheet metal machines, common hand tools and personal protective equipment. Trainees learn basic math important in sheet metal work including basic geometry, measuring, and using trigonometric functions to determine angles. Trainees will understand blueprint reading fundamentals including symbols, dimensions, and tolerances.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	
<b>Metallurgy</b>	This class is designed to provide information into the aspects of steel compositions, heat treating, plating and surface treatments available on the market. Course topics include, but are not limited to, explanations of various heat treatments plus case hardening treatments as well as operations such as electroplating, anodizing, and black oxidizing.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	
<b>Plastic Injection Mold</b>	This course is designed to provide a thorough understanding of injection molding basics and terminology. Course topics include Injection mold cycles, control, plastics flow, troubleshooting issues and molding strategies.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	



<b>Forklift Safety &amp; Operation</b>	This course prepares students with the skills to operate a forklift safely. Participants are taught the OSHA requirements for Powered Industrial Truck Regulation 1910.178, the requirements for safe operation of a powered industrial truck and are expected to demonstrate the ability to safely operate a powered industrial truck.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

## Mechanical

<b>Mechanical Systems &amp; Drives/Power Transmission</b>	This course provides participants with knowledge of chain drives, sprockets, belt drives, gears, motors, clutches, and couplings with a focus on safety. Upon completion of this module the trainees will exercise power transmission safety, perform inspection, identify components, understand terminology, and perform maintenance.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>Equipment Leveling &amp; Alignment</b>	This course provides the students the skills needed to identify components and demonstrate the best practices used in manual laser leveling and alignment. Students learn various leveling and alignment techniques and get hand-on practice leveling and aligning different components. This course is designed to provide practical training for maintenance technicians who have no or limited background in this area of service (Not intended for a journeyman millwright).
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

<b>Pipefitting &amp; Tube Bending</b>	This course provides participants the ability to read drawings and identify the equipment used in pipefitting and tube bending applications. Course topics include pipefitting, methods of tube bending, pipe materials, joints, fittings, pipe hangers and support applications. Upon completion, trainees will be able to read and discuss technical information, identify the correct pipefitting tools, and perform a piping installation.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>Lubrication</b>	This course exposes participants to the properties of different lubricants. Combining lecture and hands on exercises, participants learn to recognize various types of lubrication systems, how they operate, their maintenance requirements and the importance of following lubrication schedules.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

<b>Pumps, Seals, Bearings &amp; Lubrication</b>	This course will provide participants with an understanding of pumps, seals, bearings, and lubrication. Through lecture and hands on exercises, trainees learn how these components are used, important terminology, and advantages/disadvantages of different components. Participants apply knowledge as they practice installation, maintenance, and troubleshooting of the different components.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>Rigging</b>	This course provides participants with rigging skills and understanding of rigging safety and knowledge of equipment used in rigging applications. Course topics include rigging gear, inspection, load calculations, and manipulating equipment moves. Upon completion of this module the trainees will understand basic OSHA principles, rigging safety and inspection, rigging components, terminology, and rigging fundamentals.
<b>Length:</b> 16 Hours	
<b>Prerequisites:</b> None	

## HVAC

<b>Electrical Fundamentals for HVAC Technicians</b>	This course covers theories and applications of electricity as it applies to refrigeration devices. The class is a combination of lecture and lab where the student will construct and test various electrical circuits to verify circuit operation on a HVAC breadboard. The student will apply the theory learned in the lecture, with hands on labs that build on one another as the student advances through the class. Target checks (quizzes) are imbedded into the class to make sure the student develops a full understanding of the learning objective before advancing to the next learning level. This course also will help the student develop troubleshooting strategies by constructing circuits from wiring diagrams and knowing what to expect; or not to expect.
<b>Length:</b> 40 Hours	
<b>Prerequisites:</b> None	

<b>Electricity &amp; Electronics Troubleshooting for HVAC Technicians</b>	This course covers basic electricity, basic electronics, practical circuits, and systems related to the needs of air conditioning and refrigeration technicians. This course covers electrical concepts thoroughly, including the more complex circuits and problems that technicians encounter in the field.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> Electrical Fundamentals for HVAC Technicians	

<b>HVAC - Servicing Refrigeration Devices</b>	In this class student learn about refrigeration devices, central air conditioning, refrigerators, freezers, water chilling devices and similar items that condition air temperature. Students learn the history of refrigeration devices, refrigerants, The EPA [Environmental Protection Agency] standards, symbols of electrical devices and their operation. The student will identify the components of a refrigeration device & learn how to know if a particular part is good or bad.
<b>Length:</b> 24 Hours	
<b>Prerequisites:</b> None	

<b>HVAC - Servicing Heating Devices</b>	This class will cover the basics of heating devices. A history of heating devices and methods of heating a home, dwelling or room. Using a trainer board, the participant will identify and test each circuit component using a DVM (digital voltmeter). The class touches on older versions [60%] of heating systems and advances through the 80%, 90% and 90% + models. Glow Plug, spark igniter, hot surface and induced draft electrical systems will be explained. Students will breadboard [Build] different types of electrical heating circuits throughout the class.
<b>Length:</b> 32 Hours	
<b>Prerequisites:</b> Electrical Fundamentals (or equivalent experience)	

## Example Programs

Maintenance Technician	
Course	Hours
Blueprint Reading	16
GD&T	16
Electrical Fundamentals	40
Motor Control & Drives	40
Robot Operations & Programming	40
Digital Electronics	40
Fluid Power	24
Electronic Sensors	40
Mechanical Systems & Drives	40
Rigging, Machine Leveling & Alignment	40
Intro to PLC	40
<b>Total Hours</b>	<b>376</b>

Controls Technician	
Course	Hours
Electrical Fundamentals	40
Motor Control & Drives	40
Digital Electronics	40
Electronic Sensors	40
Robot Operations & Programming	40
Robot Electrical Troubleshooting	40
Advanced Robot Operations	40
Fluid Power	24
Welding	16
Basic PLC	40
Intermediate PLC 1	40
Intermediate PLC 2	40
PLC Troubleshooting	40
<b>Total Hours</b>	<b>480</b>

Robot Technician	
Course	Hours
Electrical Fundamentals	40
Motor Controls & Drives	40
Electronic Sensors	40
Robot Operations & Programming	40
Robot Electrical & Troubleshooting	40
Advanced Robot Programming	40
Robot Mechanical Teardown & Rigging	40
Fanuc iRVision 2D	24
Fluid Power	24
Basic PLC	40
<b>Total Hours</b>	<b>368</b>

Production Assembly Operator	
Course	Hours
Manufacturing Safety	16
Teamwork	16
Blueprint Reading	16
Metrology	8
SPC	16
Fluid Power	40
Electrical Fundamentals	40
Mechanical Systems & Drives	40
Manufacturing Processes	16
<b>Total Hours</b>	<b>208</b>

Nuts and Bolts	
Course	Hours
OSHA 10	10
Shop Math	24
Blueprint Reading	16
GD&T	16
Metrology	8
Manufacturing Processes	16
<b>Total Hours</b>	<b>90</b>