



# SME Certified Manufacturing Associate Training Program

**Intro to Additive Manufacturing 111** - This class introduces the basic concepts of additive manufacturing (AM), and discusses the history and development of AM, as well as the future. In addition, the basic process of AM is outlined and the technologies and classifications of AM are explored.

**Intro to CNC Machines 201** - "Intro to CNC Machines" provides a comprehensive introduction to computer numerical control (CNC), which uses numerical data to control a machine. This class also describes PTP positioning and continuous path systems. After taking this class users should be able to describe common components of CNC machine tools and controls.

**Intro to Assembly 100** - This class describes the common assembly methods of mechanical fastening, adhesive bonding, and welding.

**Safety for Assembly 211** - This class provides a comprehensive overview of different safety precautions for assembly. Assemblers must wear proper clothing and protective equipment, which varies for different tasks. A safe assembly site is organized and clean, with clear paths around workstations. Working in assembly requires an awareness of electrical, forklift, and point of operation safety precautions, as well as proper fall prevention and tool handling procedures. Applying ergonomics to assembly helps prevent injury caused by repetition, poor posture, and excessive force.

Before beginning any assembly work, assemblers must know the appropriate safety precautions and be trained to use required protective equipment. This can be challenging because there are different precautions for different tasks. After taking this class, users will be familiar with the basic safety guidelines for assembly, which will prepare them to perform various assembly operations safely and effectively.

**Tools for Threaded Fasteners 235** - This class provides a comprehensive overview of the different tools that are used to assemble threaded fasteners. There are many different types of tools used with threaded fasteners, but they all operate by applying torque. Manually powered hand tools include wrenches and screwdrivers. Power tools include battery-operated tools, electric tools, and pneumatic tools. Many power tools use clutches to control operation. These may be continuous-drive tools or discontinuous-drive tools.

Threaded fasteners are the most commonly used fasteners in assembly, and assemblers must be familiar with the different tools they require. After taking this class, users will have foundational knowledge of the different types of tools used with threaded fasteners and their advantages and disadvantages. Users will also be able to identify some of the factors that go into selecting a tool for a threaded fastener application.

**Basic Measurement 101 (Basic Measurement 110/Linear Instrument Characteristics 115)** - This class offers an overview of common gaging and variable inspection tools and methods. Variable inspection takes a specific measurement using common devices such as calipers and micrometers. The sensitivity of the instrument must be greater than the measurement being taken. Both calipers and micrometers are read by finding the alignments in lines on the devices. Gages, such as gage blocks, plug gages, ring gages, and thread gages, reveal whether a dimension is acceptable or unacceptable without a specific quantity. All inspection devices should be properly mastered and maintained to retain accuracy. One of the fundamental activities of any shop is the measurement of part features. Consistent measurement and inspection maintains standardization and ensures that out-of-tolerance parts do not reach customers. After taking this class, users should be able to describe the use and care of common inspection instruments and gages used in the production environment.

**Basics of Tolerance 120** - This class explains the purpose of tolerances in manufacturing and describes how these tolerances are specified. Includes an Interactive Lab.

**Blueprint Reading 130** - This class identifies the information communicated on a blueprint with emphasis on interpreting the part drawing. Includes an Interactive Lab.

**5S Overview 151** - This class provides a thorough introduction to the purpose and process of 5S quality initiatives. This class includes separate discussions on each of the five steps, along with information on challenges, advantages, and possible assessment tools.

Many companies implement quality initiatives to improve operations and eliminate waste. 5S is a quality method that promotes organization, efficiency, and team work through several sequential steps. After completing this class, users will understand the value of each 5S step and be better equipped to execute and evaluate 5S.

**Troubleshooting 181** - This class provides a comprehensive overview of various methods and tools used to troubleshoot problems. Troubleshooting often involves finding the root cause of a problem and being able to distinguish deviations from problems and early warning signs from warning signs. Many tools are used to collect and interpret troubleshooting data, including check sheets, fishbone diagrams, and Pareto charts. The 5 Why technique, brainstorming, documentation, and troubleshooting teams are common methods of gathering troubleshooting data. Troubleshooting teams gather data in order to find possible solutions. Teams must test solutions to make sure they offer long-term results.

Troubleshooting is an extremely important skill for all areas of industry. The information provided in this class prepares students to solve problems and understand how to work to prevent them in many different settings. Without this knowledge, students would not be able to solve problems effectively.

**Quality Overview 100** - This class identifies how each department and function of a company plays a role in producing quality products for the customer.

**Intro to Robotics 110** - This class covers the classifications, characteristics, and functions of industrial robots as well as basic safety precautions for working with robots.

**Robot Safety 211** - This class discusses the different ways to prevent robot accidents. Robot accidents can result in serious injuries or fatalities. Most accidents occur because employees bypass the robot's safeguards.

There are two kinds of safeguarding systems that protect employees from injury when working with robots. Safety devices stop a robot from operating. Presence-sensing mats, for example, end robot operations when the pressure or weight of an employee is detected. Safety barriers prevent employees from accessing or entering dangerous robot work areas. For example, perimeter fences block employee access to areas where robots are working.

Employees must receive training on the robot and wear protective clothing when near the robot. The robot must be installed and maintained as intended by the manufacturer and by authorized personnel only. All robot operators require a certain level of experience and training to work with the robot

**Bloodborne Pathogens 161** - This class explains the nature of common bloodborne pathogens and how to handle exposure in the workplace. A bloodborne pathogen is a microorganism present in human blood that can cause disease. Common pathogens include HIV, which causes AIDS, HBV, which causes hepatitis B, and HCV, which causes hepatitis C. Exposure to blood can occur in the workplace through work-related tasks and procedures, through accidents, or by administering first aid. To avoid exposure, workers should observe the universal precautions recommended by the CDC. Employers are required by OSHA to implement controls to minimize exposures in the workplace.

Employees who understand how to protect themselves from bloodborne pathogen exposure make the workplace safer for everyone and benefit their employer. After taking this class, users should be able to describe OSHA regulations regarding bloodborne pathogens and how they impact day-to-day operations in the workplace.

**Intro to OSHA 100** - This class covers the goals and purposes of the Occupational Safety and Health Administration, including its standards, programs, and interactions with employers and employees.

**Ergonomics 102** - This class provides an overview of the science of ergonomics and its application in the workplace. Ergonomic hazards may be present in any work environment, and are a common safety risk. Not all ergonomic risks are apparent, but they can still cause musculoskeletal disorders (MSDs). Vibration, poor posture or positioning, and repetitive motion are common ergonomic hazards, though back injuries are the most common workplace injuries. The majority of work-related back injuries are caused by unsafe lifting techniques. Even computer tasks can cause MSDs over time. Ergonomic solutions should be tailored to the individual employee performing the job or task.

Ergonomic programs are an effective way for any employer to increase employee safety, decrease injury and illness, reduce sick time, boost employee morale, and reduce turnover rates. Implementing proper ergonomics in the workplace increases productivity and reduces the cost of sick leave and new employee training.

**Personal Protective Equipment 111** - This class introduces the purpose and uses of personal protective equipment (PPE). As defined by the Occupational Safety and Health Administration (OSHA), PPE minimizes exposure to hazards and helps prevent injury. In order to select appropriate PPE, employers must first evaluate the workplace with a hazard assessment. PPE may be categorized by the area of the body it protects. PPE is available in several types, designs, and materials. Every employer is responsible for providing the appropriate PPE for workers who require it, and it is every employee's responsibility to properly wear and use PPE. OSHA does not often specify which types of PPE should be worn, but requires that employers train each employee in proper use and retrain when PPE changes or if PPE is used improperly. After taking this class, users should be able to describe OSHA regulations regarding personal protective equipment and how they impact day-to-day operations in the workplace.

**Lockout/Tagout Procedures 141** - This class details the OSHA requirements and best practices for preventing accidental startup during maintenance and repair. It addresses electrical power and the many other forms of energy that a machine or device may use. All forms of energy must be successfully restrained or dissipated in order for safe maintenance. "Lockout/Tagout Procedures" describes using a lockout device that prevents unauthorized access of the energy-isolating mechanism. OSHA has strict requirements for lockout and tagout devices, which must be standardized, easily recognized warning signs. Users will learn OSHA's specific steps for all parts of the control of hazardous energy, from shutdown to startup, including defining authorized vs. affected employees.

Following proper lockout/tagout procedures is essential to preventing employee injuries and fatalities. All employees must be familiar with lockout/tagout in order to prevent the dangers of accidental machine startup.

**SDS and Hazard Communication 151** - This class focuses on communication methods about hazardous workplace substances and how they increase employee awareness and safety. Education, labeling, data collection, testing, and other communication methods detail the dangers of specific chemicals and offer methods of protection from physical and health hazards. OSHA requires that employers establish a written hazard communication program to communicate employee responsibilities, standard implementation, chemical hazards, and safety measures. Hazard communication programs must include a chemical inventory, specific labeling, SDS for each individual chemical, and training.

After taking this class, users will be able to describe OSHA regulations regarding hazardous materials and SDS and their impact on daily workplace operations. Understanding these regulations is critical in maintaining workplace safety and efficient operation.

**Hand and Power Tool Safety 201** - This class provides guidelines for the safe use of common hand and power tools. Employees should never remove any safety guards from a tool's point of operation unless authorized. Tools must be regularly cleaned and maintained, and all blades must be kept sharp. The worksite must be kept organized, clean, and dry. All tool applications require PPE, including eye and other protection. Before working, employees must consult the owner's manual and be familiar with how the tool functions. Employees must also use the right tool for the job and follow the work practices that are specific to each type of tool.

When employees use proper safety guidelines when handling hand and power tools, their employers benefit from reduced accidents on the job and lowered costs caused by work-related injuries. Safe handling of tools also increases work quality. After taking this class, users should be able to describe the safe use and care of hand and power tools.

**Fire Safety and Prevention 181** - This class examines common workplace fire safety procedures. Fires, no matter how small, should be reported immediately. Buildings are equipped with extinguishing systems that actuate an alarm and discharge an extinguishing agent to control advanced stage fires. Portable fire extinguishers are available for extinguishing incipient stage fires using the P.A.S.S. technique. Employees not authorized to fight the fire should evacuate immediately. Employers should create an emergency action plan that dictates the procedures to be carried out in the event of an emergency. In the event of a fire, employees should stay calm, follow procedures, and go directly to assembly areas. Employers must account for all employees and provide first aid until medical services arrive. After taking this class, users will be able to describe OSHA regulations regarding fire safety and how they impact day-to-day operations in the workplace.

**Math Fundamentals 101** - The class "Math Fundamentals" covers basic arithmetic operations, including addition, subtraction, multiplication, and division. Additionally, it introduces the concept of negative numbers and integers. The class concludes with an overview of the order of operations and grouping symbols.

**Math: Fractions and Decimals 111** - "Math: Fractions and Decimals" provides the methods used to perform basic mathematical operations using fractions, decimals, and percentages. The class covers addition, subtraction, multiplication, and division with fractions and decimals. It also discusses conversions between fractions, decimals, mixed numbers, and improper fractions.

**Units of Measurement 112** - The class "Units of Measurement" provides a thorough explanation of the English and Metric systems and how conversion between them occurs. After taking this class, users should be able to perform calculations involving common English units, metric units, and conversions between the two systems.