



Industrial Maintenance and Automation Technician Program

Course Descriptions

Manufacturing

Prerequisite

Course will begin with a generic safety course on the hazards experienced in the field. Introduction to OSHA and PPE is covered, fire safety, lifting, area security, scaffolds and ladders, lockout/tagout, grounding, fuses and disconnects, motors, capacitors, test equipment, hazardous material handling and communication, and extinguisher usage. Ten hours is dedicated to tool usage and tool control procedures. Measuring tools from tape measures to precision micrometers and dial calipers is covered. Blueprint reading will be covered with different sections on the different types of blueprints and manufacturing work orders. Fractions, order of operations, decimals, and ratios are covered in the math section. Mechanical fasteners describing the different types of bolts and threads will be taught with the student drilling and taping several holes. The fastener lab will complete itself with a student removing several shorn bolts. Different types of preventive maintenance (PM) is described covering oils and greases, vibration analysis, thermography, and hands on experience doing PMs on shop equipment such as a crane, lathe, mill, and forklift. The class also teaches the manufacturing techniques of Six Sigma and Lean Manufacturing, then gives an introduction to the basic structure of the typical corporation. The class ends with an overview of basic troubleshooting principles.

Tech Basics

Prerequisite: Manufacturing

Students will learn basic technical skills such as mechanical power transmission through gearing; safe lifting practices using rigging and cranes; bearing tolerances and inspection along with various methods of mounting bearings. 10 hours are dedicated to cutting, threading, and fitting pipes and pipe controls and joints. Students will disassemble, inspect, record, and reassemble various types of hydraulic and pneumatic pumps. The conveyor portion will require cutting, lacing, and tracking belts; as well as replacing multiple rollers, swapping motors, and wiring that motor to a functional control box.

Welding (SMAW)

Prerequisite: Manufacturing

After covering area-specific safety for the welding class the students will learn about cutting processes such as grinding, oxyfuel cutting and plasma cutting to prepare coupons for later welding projects. The class will be centered around all of the common welds. stringer beads, 50% overlaps, tee joints, and v-grooves in the 2F, and 1G positions. The course will also include a pipe to plate projects to force students out of their comfort zone and onto round objects. As the students build each project they will learn welding symbols, metal prep, and bead quality as it applies.

Welding Wire Feed

Prerequisite: Welding SMAW

In the Wire-feed class, we will reinforce the safety and cutting skills taught in the SMAW class. The class will cover both GMAW and FCAW. The class will be centered around tee joints, and v-grooves in the 2F, and 1G positions.

Welding TIG

Prerequisite: Welding Wire Feed

In the TIG welding class, we will reinforce the safety and cutting skills taught in the SMAW class. The class will cover both TIG welding on steel base metal. The class will be centered around tee joints in the 2F.

Intro to Machinist

Prerequisite:

This course provides the foundation for all machine technology processes such as hand tools, measuring instruments, blueprint reading, milling processes, and lathe processes. Students will be required to build 12 different projects from blueprints to show competency in the machining trade.

Machinist

Prerequisite: Intro to Machinist

This course provides the foundation for all machine technology processes such as hand tools, measuring instruments, blueprint reading, milling processes, and lathe processes. Students will be required to build 12 different projects from blueprints to show competency in the machining trade.

Introduction to Hydraulics and Pneumatics

Prerequisite

This course is a study of fluid power as the transfer media. Complete hydraulic systems are studied including power sources, reservoirs, pumps, lines, valves and actuators. Students will learn troubleshooting strategies to identify, localize and correct malfunctions. Preventative maintenance and safety issues will also be discussed.

Basic Electrical System

Prerequisite

This course consists of electrical safety, theory, and application of DC and AC components and concepts. The electrical theories covered in this course are electron flow theory, Ohm's law, Kirchhoff's law, induction, parallel, and series circuits. The course will also train students to read electrical schematics, wiring basic to advanced circuits, how to use electrical tools and troubleshoot using test equipment. The course will also cover a large variety of components such as transformer, AC to DC converters, Normally open/normally closed switches, motors, relays, timers, capacitors, resistors, diodes, LED, and transistors. Students will gain knowledge of different voltages used in industrial and home electrical. The circuit voltages cover in this course are 24 volt AC, 120 volt AC, 9 volt DC and 24 volt DC. A student leaving this class should have a very good base understand of electrical and be ready to tack more complex electrical classes and troubleshoot basic electrical problems found on the job.

Motor Controls

Prerequisite: Basic Electrical System

In this course, students will take an in-depth look at the correct operation and wire of a control circuit, power circuit VFD's and motors. Students will also further their skills in electrical symbols and schematics reading from basic electrical to wire basic and advanced control circuits using relays, timers, transformers, and contactors.

PLC

Prerequisite: Motor Controls

This course examines ladder logic and programming techniques of Programmable Logic Controllers (PLCs) through hands-on experience. Students will use Allen Bradley Programmable Controllers and will integrate them with switches, and various inputs and output through multiple real-life scenarios in the hands-on labs with real components attached for testing. The student will gain an in-depth knowledge of programming timers, counters, sequencers, OIC, XIO, OTE'S and single-shot instructions

Workplace Relations

Prerequisite

Through a series of chapters and guided interaction, students will explore the principles of relational leadership and learn to develop individual and group leadership skills. Content areas include decision-making, goal setting, effective communication, servant leadership, organization and time management skills.