# Industrial Machine Repair (IMR) Boot Camps: Skills Validation Review

February 1, 2013

## Blueprint Reading/Schematics
606-121  
36 hours

This course will focus on providing the knowledge needed by maintenance professionals to extract information from blueprints and schematics. Sketching parts and drawing schematic circuits will also be explored.

## Pneumatics/Hydraulics
612-102  
72 hours

The fundamental principles and physical laws governing fluid power and pneumatics are studied. The operation of the various control valves and actuators will be explored through a combination of theory and practical lab exercises.

## Mechanical Skills
628-109  
90 hours

This course covers the basic mechanical skills needed by a technician. Skills covered include the use and care of hand tools and small power tools, drilling, tapping, removal of broken bolts, studs, and helicoil insertion. Basic measuring tools and techniques are also covered. Other topics include type and use of fasteners, lubricants and adhesives used in repair, and assembly of automated machines.

## DC/AC
605-113  
72 hours

An introductory course that presents the scientific foundation used throughout electronics technology. Topics include DC/AC forms of current, voltage, resistance, capacitance, inductance, and power. Troubleshooting practices will be emphasized and computer technologies will be used to enhance abstract theory. Students perform laboratory experiments and prepare technical reports.

## Mechanical Power Transmission
462-103  
90 hours

Students will learn bearing design and application, bearing failure and analysis, properties of lubrication and correct lubrication procedures, gear drives, belt drives, gear reduction units, and chain and shaft drives. Troubleshooting and maintenance of these types of power transmissions will be emphasized.

## Applied Math
804-370  
72 hours

Reviews the four basic mathematical operations on whole numbers, fractions, and decimals. Also covers basic algebra and trigonometry related to technical fields.

## Introduction to Industrial Controls
602-103  
108 hours

Industrial electrical hardware such as motors and controls are studied. Industrial electrical control circuits are developed and wired. Troubleshooting techniques are used to correct problems in wiring or controls. Motor starters, industrial control relays, timers, proximity switches, and electric eyes are studied, including proper selection and wiring techniques. Ladder logic and wiring diagrams are examined and drawn. This course is for an individual that already has a basic understanding of electricity.

## Workplace Safety MSSC
625-147  
18 hours

This course introduces the student to safety and loss prevention in the workplace with an emphasis on the workers awareness for maintaining a safe, productive environment. The student will study safety concepts, hazards controls, developing safety and health programs and Federal and State mandated regulations. This course will also focus on specific content in the MSSC Safety module.

## Machine and Equipment Installation
462-104  
90 hours

Machine and Equipment Installation will cover the installation and setup of complex machinery and equipment. Precision machine leveling, alignment, laser alignment, and scraping fundamentals will be included in this course.

## Mechanical Machining
462-101  
108 hours

Students will learn the operation of machine tools necessary for industrial machine repair. The operation of a lathe, mill, drill press, and band saw will be incorporated in the manufacturing of repair parts and fabrications. Skills using precision measuring tools will also be advanced.
Module 1: Work Productively
1.1 Complete projects within a specified time frame.
1.2 Complete projects within the resource parameters allowed.
1.3 Prioritize goal related tasks on projects according to the project timeline.
1.4 Apply industry standards and practices to ensure quality work.
1.5 Work independently up to the required speed and quality levels.
1.6 Seek out opportunities to increase quality and or reduce time requirements for projects.

Module 2: Follow Directions
2.1 Evaluate directions in order to both: follow them exactly and uncover unknown problems.
2.2 Interpret a set of written instructions accurate to its original intent.
2.3 Interpret a set of verbal instructions accurate to its original intent.
2.4 Clarify instructions prior to producing a product to ensure the desired quality.
2.5 Apply step-by-step procedures to produce a product to the exact required specifications.
2.6 Complete a task independently based on clarified verbal and/or written instructions.

Module 3: Maintain a Safe Work Environment
3.1 Identify unsafe conditions.
3.2 Carry out safety procedures.
3.3 Correct unsafe conditions.
3.4 Maintain an organized, clutter free work area.
3.5 Complete safety training.
3.6 Evaluate safety procedures for ways to improve them.

Module 4: Think Critically
4.1 Differentiate assumptions from reality.
4.2 Question assumptions.
4.3 Maintain an open mind approaching concepts and problems from different views and perspectives.
4.4 Use systematic logical thinking to analyze a process.
4.5 Propose alternate problem-solving methods for technical problems.
4.6 Make decisions independently.

Module 5: Apply Problem Solving Strategies
5.1 Devise strategies to enable completion of tasks with incomplete information and/or unavailable resources.
5.2 Analyze a process or procedure by breaking it down into manageable individual tasks or steps.
5.3 Separate the symptoms from the causes of problems.
5.4 Identify “root causes” of a problem.
5.5 Use quality tools and techniques to arrive at possible solutions to problems.
5.6 Establish reasoned criteria in order to select the best potential solutions.

Module 6: Apply Mathematical Reasoning
6.1 Identify the mathematical formula or theory that would apply to a specific manufacturing task.
6.2 Apply math skills to industry problems.
6.3 Apply math skills to quality tools.
6.4 Use measurement related math skills in dimensional drawings to arrive at exact specifications.
6.5 Use math skills in interpreting blueprints or dimensional drawings to reveal unprinted information.

Module 7: Work Cooperatively in Teams
7.1 Work with others on a team to solve problems.
7.2 Identify your individual role as a team member.
7.3 Participate in group decision making.
7.4 Contribute to the successful completion of group projects.
7.5 Apply the strengths and opinions of others to assist in completing projects.
7.6 Participate in cross-program group projects requiring team participation.

Module 8: Communicate Clearly
8.1 Communicate using language appropriate for a business/industry setting that is free of slang.
8.2 Communicate verbally and in writing using terminology and grammar appropriate to the discipline.
8.3 Communicate in writing using grammar, spelling, format and technical terms according to established writing standards.
8.4 Be clear and concise when giving directions.
8.5 Present information in an organized format.
8.6 Develop a systematic approach to optimize the communication of group knowledge and resources.

Module 9: Listen Effectively
9.1 Listen so that specific and complicated directions are not misunderstood or misapplied.
9.2 Listen so that the message can be accurately interpreted.
9.3 Provide feedback while listening to demonstrate active receipt of a message.
9.4 Formulate a response to a message after actively listening.
9.5 Incorporate body language into the listening process that supports effective listening.
9.6 Listen to machines, equipment, and/or technology to determine if they are functioning properly or not.

Module 10: Demonstrate Integrity
10.1 Produce your own work.
10.2 Credit others for their contributions.
10.3 Demonstrate consistency in your actions to instill trust.
10.4 Demonstrate trustworthiness by being honest, dependable and reliable.
10.5 Apply ethical standards of the industry to workplace conduct whether observed or unobserved.
10.6 Analyze the available data for a project or situation and take the initiative.
10.7 Demonstrate pride in your work by striving for the highest possible quality.

Module 11: Demonstrate a Positive Attitude
11.1 Project a positive influence to others by holding a positive attitude.
11.2 Maintain control of your own attitude and do not abdicate control of it to others.
11.3 Accept constructive criticism in a positive manner.
11.4 React to negativity in a neutral tone.
11.5 Volunteer for tasks.
11.6 Be prepared for work responsibilities.

Module 12: Adapt to Change
12.1 Apply a change model and its methodology to a manufacturing change.
12.2 Cope with change using positive behaviors.
12.3 Adopt a personal philosophy incorporating lifelong learning as a means of maintaining adaptability.
12.4 Respond quickly to unexpected events.
12.5 Contribute to innovative approaches.
12.6 Think creatively.