



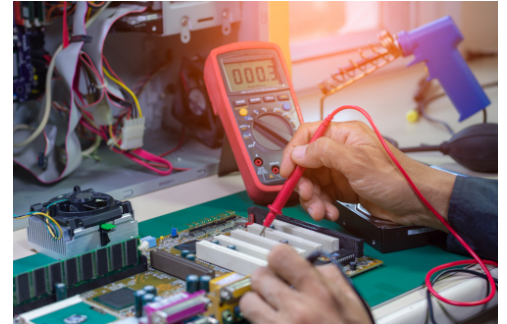
# MAINTENANCE TROUBLESHOOTING INTERNATIONAL LLC

AIE-303

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## AIE-303 ADVANCED INDUSTRIAL ELECTRICITY AND ELECTONICS FOR THE MULTI-CRAFTSMAN

This course is an overview of solid state devices and circuits. It is designed for technicians who have a basic understanding of electrical theory and expands into electronics. We cover component and circuit construction, operation, installation, and troubleshooting of electronics typically found in industrial electronic equipment, such as PLCs, VFDs and other types of equipment.



<p><b>Symbols, Circuits, and Safety</b></p> <ul style="list-style-type: none"><li>List and describe electrical circuit components.</li><li>Explain electrostatic discharge.</li><li>Identify types of drawings and diagrams used for control circuits.</li></ul> <p><b>Test Instruments</b></p> <ul style="list-style-type: none"><li>List and describe common test instruments.</li><li>Explain digital multimeter operation.</li></ul> <p><b>Resistors</b></p> <ul style="list-style-type: none"><li>Testing &amp; reading color codes</li><li>Using resistors in circuits</li></ul> <p><b>Printed Circuit Board Construction and Troubleshooting</b></p> <ul style="list-style-type: none"><li>Describe printed circuit boards.</li><li>List and describe the types of printed circuit boards.</li><li>Discuss how components are mounted on a printed circuit board.</li><li>Explain printed circuit board identification.</li><li>Discuss concerns of handling printed circuit boards.</li><li>Explain printed circuit board troubleshooting.</li></ul> <p><b>Soldering and Desoldering</b></p> <ul style="list-style-type: none"><li>Explain PC board repair.</li><li>Describe how soldering aids are used for PC board repair.</li><li>Describe the soldering process.</li><li>Explain soldering and rework stations.</li><li>Describe the methods of desoldering.</li></ul> <p><b>Diode Applications and Troubleshooting</b></p> <ul style="list-style-type: none"><li>Understand diodes.</li><li>List diode materials.</li><li>Explain forward bias.</li><li>Explain reverse bias.</li><li>Understand diode testing.</li><li>List diode applications.</li></ul>	<p><b>DC Power Supply Operation and Troubleshooting</b></p> <ul style="list-style-type: none"><li>Describe DC power supply operation.</li><li>List and describe DC power supply components.</li><li>Explain the operation of rectifiers.</li><li>List and describe DC power supply filters.</li><li>Explain the operation of voltage regulators.</li><li>Explain the operation of voltage dividers.</li><li>Explain troubleshooting DC power supplies.</li><li>List and describe power interruptions.</li></ul> <p><b>Bipolar Junction Transistors (BJTs)</b></p> <ul style="list-style-type: none"><li>Explain the operation of bipolar junction transistors (BJTs).</li><li>Describe biasing transistor junctions.</li><li>Explain transistors as DC switches.</li><li>Discuss biasing transistors.</li><li>Explain power dissipation.</li><li>Describe procedures for testing transistors.</li><li>List and describe transistor switching applications.</li></ul> <p><b>JFETs, MOSFETs, and IGBTs</b></p> <ul style="list-style-type: none"><li>Describe the types of field-effect transistors (FETs).</li><li>Explain the operation of junction field-effect transistors (JFETs).</li><li>Explain the operation of metal-oxide semiconductor field-effect transistors (MOSFETs).</li><li>Explain power MOSFETs.</li><li>Describe insulated gate bipolar transistors (IGBTs).</li><li>Explain troubleshooting IGBTs.</li></ul> <p><b>Silicon-Controlled Rectifiers (SCRs)</b></p> <ul style="list-style-type: none"><li>Define silicon-controlled rectifier (SCR).</li><li>Explain SCR construction.</li><li>Describe methods for troubleshooting an SCR.</li><li>List and describe applications for SCRs.</li></ul>	<p><b>Triacs, Diacs, and Unijunction Transistors</b></p> <ul style="list-style-type: none"><li>Describe the operation of a triac.</li><li>List and describe triac applications.</li></ul> <p><b>Solid State Relays</b></p> <ul style="list-style-type: none"><li>List and describe solid state relay switching methods.</li><li>Explain solid state relay circuits.</li><li>Describe solid state relay problems.</li><li>Discuss two- and three-wire solid state switches.</li><li>Explain troubleshooting solid state relays.</li><li>List and describe solid state relay applications.</li></ul> <p><b>Solid State Technology in Programmable Controllers (PLCs)</b></p> <ul style="list-style-type: none"><li>Explain (PLCs).</li><li>Describe areas of PLC applications.</li><li>List and describe the PLC sections.</li><li>Describe interfacing circuits.</li><li>Explain troubleshooting PLC systems.</li></ul> <p><b>CLASS FORMATS AVAILABLE</b></p> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> MTI Hands-On Center \$1295/person</li><li><input type="checkbox"/> ZOOM Interactive (Not available)</li><li><input checked="" type="checkbox"/> On-Site (Your Location) Ask for Quote</li></ul> <p><b>Quick Quote Available in 48 hrs.</b></p> <p><b>CLASS DURATION AND HANDS-ON</b></p> <p><b>3-days, 22.5 hours of instruction</b> <b>85% to 90% hands-on activities</b> <b>You progress at your own speed</b></p> <p><b>FREE COURSE MATERIALS</b></p> <ul style="list-style-type: none"><li>Lab Manual</li><li>Take home project</li></ul>
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**Class Details:** Each student will receive class books, work activity sheets, self-test progress evaluations, as well as questions from the instructor to make sure they understand the material presented. It is expected that an attendee will leave the class with the basic knowledge of the subject and possess new found skills to better equip them when they return to their job. A certificate suitable for framing will be issued to each attendee who successfully completes the course. Call, email or check the website for the next time this course is scheduled at the MTI training center. On-site sessions? Request a quick 48-hour turnaround quote. Revised: 1/12/2023