



CNC Technical Solutions - Phase 1 Industrial Electronics Course Outline

Phase 1 – Industrial Electronics

Classroom and Lab Hours - Combined 136 total hours.

Typical method of delivery - 1 day of class per week, 8 hours a day. Instructor led, combined classroom and lab delivery.

Phase 1 – Industrial Electronics is an instructor led class which covers both the Electrical and Electronic theory and practice applications. Students will work in a classroom lab setting and learn electrical and electronic fundamentals using a variety of meters and testing equipment. Students will work during this class on several building projects from kits. This class will combine electrical theory and lab components in building fundamental electrical and troubleshooting skills.

Electricity - 11th Edition

- Workplace & Electrical Safety
- The Electron
- Volts, Amperes, Ohms
- Meters, Reading a Meter & Proper Use of Hand Tools of the Apprentice
- Ohm's Law
- Power
- Series Circuits
- Parallel Circuits
- Series-Parallel Circuits
- Sources of Electricity— Batteries
- Sources of Electricity— Friction, Heat, Pressure, Light
- Magnetism
- DC Motors
- Direct Current Generators
- Alternating Current
- Capacitance
- Inductance
- RLC Circuits
- Transformers
- Semiconductors
- Integrated Circuits
- Radio & Wireless Technology
- Soldering
- Assembly & Testing Electrical/ Electronic Projects



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Practical Electrical Theory, Soldering, Electronic Project Build & Test Class

Practical Electrical Theory

Electrical theory, basic electrical safety and fundamentals of electronics.

Electronic components review - Identifying common electronic components found in modern Control's systems, including high wattage resistors, capacitors, inductors, transistors, power diodes, Operational Amplifiers or Op Amps etc.

Soldering & Project Build

Students will learn proper soldering techniques by direct hands-on practice and through physically building the following projects: DC power supply, Multivibrator Siren Oscillator, Bi-Directional Motor Controller, and a Digital Multimeter. This segment is designed to teach students to interpret an electronics schematic and learn proper build and soldering techniques, component identification and practical operation of electronic components.

Project Test and Debug

Students will test and ultimately debug the projects they build using test equipment that they learned previously in the course. The students will identify failed electronic components through the use of proper trouble shooting techniques. They will be identifying a variety of situations from failed diodes, capacitors, transistors, resistors, to relays and open conductors and faulty wiring.

The student will be supplied with the project outlined above and will be required to build, solder, tune and test each project. The student will then model the projects on a "Breadboard" and demonstrate their knowledge and technical understanding of the project. At this point the instructors will add failed components & wiring (install bugs) into the project and the student will be tasked with debugging the project using the appropriate reasoning and test equipment.



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Anticipated Learning Outcomes

Upon completion of Phase 1 - Industrial Electronics the student will achieve the following Learning Outcomes.

- Comprehend basic electrical fundamentals, laws and principles of electricity
- Be proficient in the use of digital volt meters, oscilloscopes, amp meters and other testing equipment.
- Be proficient in basic to intermediate soldering applications
- Comprehend the process of logical debugging and troubleshooting the root cause of basic electrical malfunction.
- Be proficient in building and wiring basic electrical components and circuit boards.