

Test Bench: Fundamentals of PCB Testing SYLLABUS

INSTRUCTOR INFORMATION

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Contact Procedure: Available between 6pm – 9pm Central Time USA. Text, email or message anytime.

PROGRAM DESCRIPTION

This course introduces foundational principles for understanding electrical systems and electronic hardware. Topics include basic DC & AC electrical theory, passive & semiconductor components, the use of basic test tools, and familiarity with common methods of inspection.

- Electrical Fundamentals: Ohm's Law – Voltage, Current, Resistance, Power
- DC & AC Circuits
- Passive Components: Resistors, Capacitors, Inductors
- Semiconductor Components: Diodes, and Transistors
- Basic Circuit Configurations: Series, Parallel, and Combined
- Test Tools: Multimeter and Oscilloscope
- Inspection Tools: Overview, Purpose, and Identification

Taught by a certified industry expert and award-winning educator with 25+ years of experience in the field, this four-week program utilizes interactive webinars, on-demand recordings, and job-specific exercises to develop a solid grasp of the concepts necessary for success as a new electronics test technician.

LEARNING AND PERFORMANCE OBJECTIVES

This program rapidly equips new electronics test technicians with essential electrical knowledge and troubleshooting tools to launch their careers. Upon completion, participants will:

- Understand the importance of electrical and environmental safety, including the need for PPE.
- Study basic electrical circuits, components, and properties.
- Explore equations defining Ohm's Law regarding series, parallel & series-parallel resistance.

- Mathematically predict and instinctively evaluate electrical quantities such as voltage, current and power in circuits.
- Understand the relationship between electricity and magnetism, the role of filtering components in AC circuits, and various semiconductor devices.
- Learn to use basic diagnostic and circuit analysis tools like a multimeter & oscilloscope.
- Discover common methods of testing and troubleshooting and use industry-standard inspection tools, such as Visual and X-Ray.

COURSE STRUCTURE

- Instructor and participants meet online twice per week from the comfort of their own home.
- Participants can view recorded online sessions to review course content and class discussions.
- Course materials are accessible 24/7 on the new IPC Edge Learning Management System.
- Participants can access the course virtually on any device with an Internet connection and major web browser, including Chrome, Firefox, Safari, Edge, and Internet Explorer.

IPC STANDARDS COVERED (PROVIDED WITH COURSE)

- IPC-A-610 Acceptability of Electronic Assemblies
- IPC-T-50: Terms and Definitions

COURSE SCHEDULE

WEEK 1 – SAFETY AND BASIC ELECTRICAL PROPERTIES

Program overview outlining class schedule and options for accessing class materials and assignments. Class sessions focus on safety and electrical fundamentals.

Topics include:

- Electrical, chemical, and operational safety
- PPE and accessories
- Electrostatic discharge (ESD)
- Useful metaphors in electrical terminology
- Direct and alternating current
- Ohm's Law: Predicting values in simple circuits

ASSIGNMENT:

- Basic Terms and Circuit Calculations

WEEK 2 – DC CIRCUIT CONFIGURATIONS AND TESTING

Class sessions concentrate on predicting values in various resistive DC circuit configurations and multimeter testing.

Topics include:

- Intro to schematics
- Series, parallel, and combination circuits
- Multimeter settings
- Continuity and short-circuit testing

ASSIGNMENT:

- Simple Fault Identification and Multimeter Use

WEEK 3 – AC CIRCUITS AND WAVEFORM ANALYSIS

Class sessions introduce additional components, AC circuits, waveforms, and oscilloscope use.

Topics include:

- More schematics & symbols
- Inductors and capacitors
- Magnetism and transformers
- Semiconductors: Diodes & various IC devices
- AC Waveforms
- Oscilloscope settings

ASSIGNMENT:

- Component Identification and Waveform Analysis

WEEK 4 – INSPECTION & TEST TOOLS, REVIEW, AND FINAL EXAM

Class sessions familiarize students with various industry inspection tools and troubleshooting methods. Session 2 summarizes the course and reviews for the final exam.

Topics include:

- Physical component identification
- Visual & X-Ray inspection
- Testing (In-circuit, functional, burn-in)

FINAL EXAM:

- Complete final exam after the last week of the course.
- Completion of the program with a score of 70% or higher on the final exam and/or final project is required to earn a certificate of completion.

- Attempts allowed: two. Grading method: Highest grade.