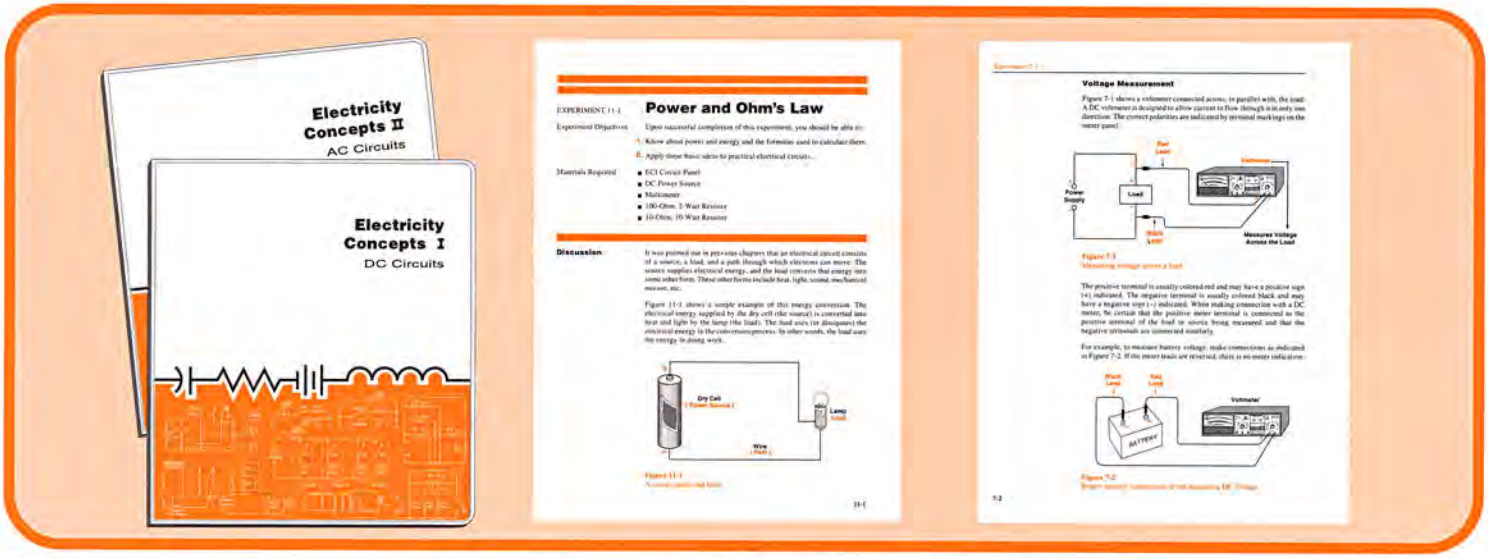
ELECTRICITY CONCEPTS I & II



Students planning careers in the Electricity/Electronics field will find this course particularly invaluable. Virtually all careers require some knowledge of Electrical Concepts, this course provides an excellent core curriculum. Practical application of concepts is provided by step-by-step circuit building, starting with the very basic circuits and leading to those more complex.

The Model 211SA Training System, "Electricity Concepts I & II," is complete with laboratory manuals, instructor's guides, mounted components with storage board and unmounted components.

THE LAB MANUALS 21101DC & 21101AC

The ECI lab manuals are designed to help the student develop a thorough understanding of the subject matter. The text is written in easy-to-read vocabulary, minimizing reading requirements. Each chapter states an objective, discusses the concept, then provides hands-on experiments so students learn by doing. DC circuits has 320 pages and contains 39 experiments, AC circuits has 344 pages and 37 experiments. Both are illustrated with large, detailed photographs, circuit layouts, oversize schematics, and diagrams. Two-color printing is used throughout for emphasis and easy comprehension.

DC circuits

Safety in the Laboratory
Safety procedures
Shock hazards
Short circuits and protection devices

Parts and Symbols
Inventory of the Electricity Concepts trainer
Symbols and part identification
Wiring procedures

Basic Electricity
Structure of matter
Conductors and insulators
Electrical Quantities

Power Sources
Batteries
Solar cells and thermocouples

Electrical Circuits
Complete circuits
Ohm's law

Series and Parallel Circuits
Series circuits
Parallel and compound circuits
Meter circuits

Electrical Measurements
Voltage and current measurement
Reading meter scales

Resistance and Resistors
Measuring resistance
Resistor color code
Variable resistors

Resistive Circuits
Series resistive circuits
Parallel resistive circuits
Equal resistances in parallel
Compound resistive circuits

Thevenin's and Norton's Theorems
Thevenin's theorem
Norton's theorem

Electrical Power and Energy
Power and Ohm's law
Power dissipation
Kilowatts

Magnetism
Magnetic poles and fields
Temporary and permanent magnets
Magnetic permeability

Electromagnetism
Magnetic fields and current
The solenoid
Electromagnetic induction
Electromagnetic induction with current

Applications of Electromagnetism
Electrical bell and buzzer
Relay

AC circuits

Alternating Current
Sine wave characteristics
Peak and peak-to-peak voltages
Effective and average voltages

Inductance
Self-inductance in a coil
Inductance and AC
Inductive circuits
Circuit applications of inductance

Capacitance
Capacitor charge and discharge
Factors that affect capacitance
Parallel and series capacitors
Capacitor charge

Capacitive Circuits
Capacitance and frequency
Series capacitive circuits
Parallel capacitive circuits
Applications of capacitors

RLC Circuits
Series RLC circuits
Parallel RLC circuits
Resonance
Source impedance

AC Power
Resistive circuits
Series reactive circuits
Parallel reactive circuits

Transformers
Induced voltage and current
Voltage and current ratios
Transformer losses
Transformer applications

Motors
DC motors
Effects of magnetic fields
AC motors

Generators
AC generators
DC generators
Generator construction

Semiconductors
N-type and P-type materials
The PN junction diode
The junction diode as a rectifier
NPN junction transistor
PNP/NPN junction transistors

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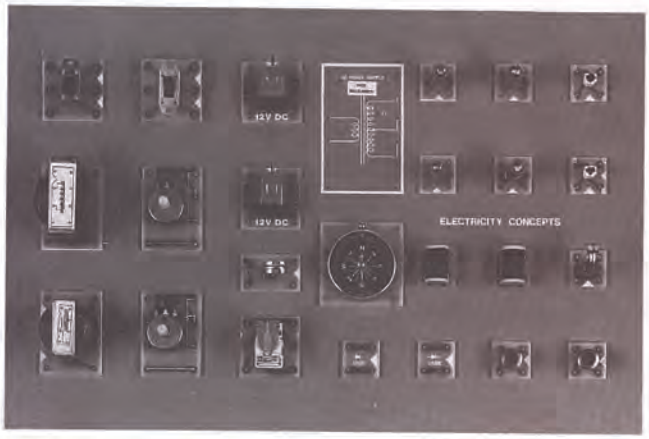


SYSTEM HARDWARE

KEYED STORAGE BOARDS

All major components for the 211SA training system are keyed to an organized storage board. Imprinted outlines of components with schematic symbols permit quick inventory and reinforce student knowledge of schematic symbols. Storage board is color-keyed to the system lab manual.

MOUNTED PLUG-IN COMPONENTS (21102)

Major components, such as semiconductors, motors, relays, etc. shown above on the storage board, are mounted on rugged commercial grade PC boards that plug into the circuit panel. For added flexibility and convenience, all transistors are socket mounted. These components include:

- 1 Potentiometer, 5K Ohms
- 1 Relay, 400 Ohms
- 1 Photocell
- 2 Push button switches
- 2 Coils, 400 Ohms
- 1 Compass
- 1 Choke, 1.5 Henry
- 1 Transistor, 2N5818, NPN
- 1 Transistor, PN5138, PNP
- 1 Thermocouple
- 1 Transformer 2:1
- 1 Potentiometer, 300 Ohms
- 2 Diodes (pair) IN4006
- 2 DC motors
- 2 Slide switches, DPDT
- 4 Lamps with socket
- 1 Storage board

UNMOUNTED PLUG-IN COMPONENTS (21106)

A complete package of thirty assorted resistors and capacitors is included. Standard off-the-shelf resistors and capacitors are used so that should replacements be needed, they may be purchased locally.

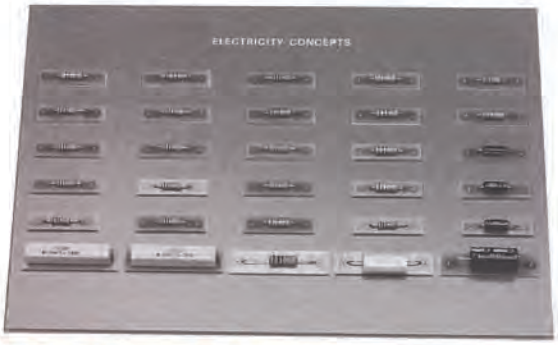
ACCESSORIES AND HARDWARE (21105)

All hardware and accessories necessary to complete the course are supplied. These include magnets, lamps, copper and steel plates, iron filings and rods, coupling, spring tips, wire stripper and hook-up wire.

OPTIONAL ACCESSORIES

The 15200 transparent Circuit Panel is required for all ECI electrical and electronic training systems. It is in use in thousands of educational and industrial applications for basic circuit set-up and advanced electronic design. The circuit panel is completely flexible and suitable for any general breadboarding work. The patented design eliminates soldering, jiffy clips, snap fasteners, or random layout on opaque wiring boards.

The 23500 Circuit Panel Easel is designed to hold the 15200 Circuit Panel at a five degree angle for ease of circuit building. A white plastic base provides maximum visibility. The base lifts out to reveal a roomy storage compartment for program materials. 16-1/2 x 11-3/4 x 3-5/16 x 1-3/16.



21106M Unmounted Components MOUNTED for added plug-in convenience and positive inventory control. The unmounted components described above are available mounted and keyed to a color-coded storage board with imprinted outlines and schematic symbols.

ENERGY CONCEPTS, INC.

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