

Course name:	ELECTRONIC COMPONENTS
Short name:	ECOM
Length:	80 hrs
Prerequisites:	ES2

Purpose

This course is an introductory course to electronic components and their characteristics. It is designed to provide a fundamental working knowledge of the most common industrial electronic components. It is an introduction to electronics for maintenance technicians.

Description

This course develops an understanding of electronic components. The class covers operation, symbols, component testing and operation in simple circuits. Calculations and lab exercises explain the theory of operation.

Topics include:

- Diodes
- Zener diodes
- LED's
- Bipolar transistors
- Transistor biasing
- Operational amplifiers
- SCRs and TRIACs
- Logic gates
- J-FETs and MOSFETs

Course Objectives:

Upon successful completion of this course, the trainee will be competent in:

- Testing the condition of electronic devices.
- Analyzing function of basic electronic circuits using schematics.
- Verifying operation of basic electronic components.
- Determining the correct size of components to use when replacements are needed.

Course name:	ELECTRONIC CIRCUITS
Short name:	ECIR
Length:	80 hrs
Prerequisites:	ECOM

Purpose

This course is a basic electronics course with an emphasis on applications. It will provide a fundamental working knowledge of common electronic circuits. It is an extension of the Electronics Components course (ECOM) for maintenance technicians.

Description

This course combines the simple component circuits discussed in ECOM to form many of the fundamental circuits used in manufacturing operations. Calculations and lab exercises support the theory of operation of the circuits covered. Labs focus on developing basic circuit analysis.

Topics include:

- Filtered DC supplies
- Voltage regulation
- Current limit
- Power supplies with adjustable output and feedback
- Switching power supplies
- Latches
- Shift registers
- Digital counters
- Digital to analog conversion
- Analog to digital conversion

Course Objectives:

Upon successful completion of this course, the trainee will be competent in:

- Analyzing function of common electronic circuits using schematics.
- Verifying operation of electronic circuits.
- Determining the correct size of components to use when modifications or failed components are needed.

Course name:	ELECTRONIC MEASUREMENT SYSTEMS
Short name:	EMS
Length:	160 hrs
Prerequisites:	ES2 and ECIR

Purpose

This course develops comprehension of electronic instrumentation and its application in process measurement and control. It is designed for maintenance technicians.

Description

This course focuses on the electronic circuits used in instrumentation. Analytical skills are developed and enhanced through analysis of circuit operation and circuit parameters. Circuits are observed and verified using oscilloscopes and multi-meters. A better understanding of electronic schematics results in enhanced analytical ability. Trainees are taught to develop references and calibration procedures for circuits.

Topics include:

- Instrumentation amplifier
- Pressure/force measurement (strain gages)
- PID control modes and analog circuitry
- Active integrator and differentiator circuits
- Temperature measurement (thermistors, RTDs, thermocouples)
- Hall effect devices
- Various passive and active filter characteristics and expected outputs
- Position measurement devices and feedback circuitry (LVDT's and resolvers)
- Frequency to voltage conversion

Course Objectives:

Upon successful completion of this course, the trainee will be competent in:

- Verifying the operation of electronic transducers.
- Analyzing function of electronic circuits used in measurement systems.
- Developing technical write ups for calibrations and analysis.