

## Basic Electronics (Analog & Digital)

### Course general description:

Electronic troubleshooting, maintenance and repair programs offer introductory training adequate for technical level career opportunities, such as wiring installers or technicians. They are intended for beginning students seeking training in circuits, wiring and related skills. Programs cover the National Electrical Code, since attends performing maintenance work are required to be fluent in this standard. Though most students entering such programs have little to no knowledge of the field, those with prior work experience or coursework in electronics may enter the program with advanced standing.

### Audience:

This course is intended for:

Instrument, control, automation or process engineers and technician whom seeking for basic information about electronics devices.

### Course objectives:

This course will provide an introduction to instruments technology: DC circuitry analysis, AC circuitry analysis, basic electronic components and logic circuits. Instruments used in the study of basic electronics are discussed, demonstrated, and used emphasis on interpretation of schematic diagrams, bread boarding, familiarization with electronic components.

Attends shall be able to calculate:

- steady state voltages, currents, and power for DC and AC circuits
- the impedance of capacitors and inductors
- biasing circuitry for common-emitter transistor amplifiers
- voltage and current waveform of simple diode circuitry including rectifiers

Attends shall also be able to:

- Create and read schematic diagrams.
- Wire simple electrical and electronic (instrument) circuits.

### Course duration:

5 days

### Course location:

Cairo-Dubai-Istanbul

### Course contents:

#### **Day-1**

#### **Module (01) Industrial electronic systems component**

**Upon successful completion of this Learning Outcome Guide, you will be able to understand**

- Basic shop practices and safety training
- Resistors (Color stander, Measuring, troubleshooting)
- Capacitor (types, Measuring, troubleshooting)
- Inductor (types, Measuring, troubleshooting)
- Semiconductor Material.
- Diode
  - ✓ Idea of operation

- ✓ Types (Zener Diode, Switching Diodes, Rectifier Diodes& Optical diodes)
- ✓ Maintenances
- ✓ Troubleshooting
- ✓ Application
- Thyristor
  - ✓ Idea of operation
  - ✓ Types (MOS, BJT)
  - ✓ Maintenances
  - ✓ Troubleshooting
  - ✓ Application

#### **Day-2**

- Traic
- Idea of operation
  - ✓ Idea of operation
  - ✓ Maintenances
  - ✓ Troubleshooting
  - ✓ Application
- Diac
  - ✓ Idea of operation
  - ✓ Maintenances
  - ✓ Troubleshooting
  - ✓ Application
- Integrated Circuits
- Electrical wiring (wires & instrument cables)
- Printed circuit board PCB
  - ✓ Transformer
  - ✓ Fuse
  - ✓ Pushbutton

#### **Day-3**

##### **Module (02) Basic Instrumentation / Electricity**

**Upon successful completion of this Learning Outcome Guide, you will be able to understand**

- Electrical component (Passive, Active) and practical field example
- Electrical / Instrumentation components
- Reading of electrical Drawing
- Symbols of instrumentation system
- Instrumentation drawing
- Basics of Safety dealing with instrumentation and electrical system

#### **Day-4**

##### **Module (03) Instrument Components**

**Upon successful completion of this Learning Outcome Guide, you will be able to understand**

- Instrument sensors
- Pressure, Level, Flow & Temperatures switches
- Pressure, Level, Flow & Temperatures Transmitter
- Thermocouple
- Resistance temperature detector (RTD)
- Pressure Regulator
- I to P Current to pressure
- Control valves Solenoid valves
- Emergency shutdown valves

#### **Day-5**

#### **Module (04) Electric control systems**

**Upon successful completion of this Learning Outcome Guide, you will be able to understand**

- Types of Control
- Relaying systems
- Introduction to programmable logical controllers
- Introduction to SIS
- Introduction to SCADA and DCS
- RTU

#### **Methodology:**

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions
- 10% Software (if applicable or examples)

#### **Course code: (TEEI001)**