Industrial Automation Training Academy

Presents

Arduino, LabVIEW & PLC Training Programs
Duration: 6 Months (180 ~ 240 Hours)

For:
Electronics & Communication Engineering
Electrical Engineering
Instrumentation Engineering

Training Module: Arduino & LabVIEW
Arduino – UNO, Duemilanove & Due Series
LabVIEW – 2012 Version
Training Curriculum:
Arduino – Smart Embedded Controller

Embedded System Training

PCB Designing, Wiring & Programming

Chapter 1

Getting started with Arduino – A smart Controller for an Engineer

- Introduction to Arduino
- Setup your computer to use Arduino
- Understanding electronics elements – Resistors, capacitors, transistors, relays etc.

Designing of Circuits using Fritzing Software

- Introduction to Fritzing – An Open Source Platform to design Arduino Circuits
- Study & Designing of Breadboard Layouts for Embedded Projects
- Study & Designing of Schematics Diagram of the project

Introduction to Basic C – Programming Platform for Arduino

- Understanding Header Files, Functions, Loops, Case Structure, Conditional statements required to design Embedded Projects
Chapter 2

Working with LED’s – Using Arduino – For Loop, While Loop, Conditional Statement (if-else)

Blinking of LEDs

- Fading of LED
- Circling of LEDs
- Blinking of EVEN and ODD states of LEDs
- LED dice, Traffic light system. And many more projects

Chapter 3

Serial monitoring – Reading Feedback in Real time from Arduino Board

- Controlling of LEDs from your computer
- Reading analogue and digital inputs

Chapter 4

Digital inputs – Interfacing Digital Inputs to Arduino

- Controlling Outputs using push button, IR Sensor, Limit Switch
• Interfacing Relays & SSR to actuate Heavy Load at the output like Single Phase/ Three Phase Motor, Lamp, FAN, Pump etc.

Chapter 5

Analogue inputs – Reading Analogue Inputs at Real Time

• Controlling Outputs (Motor, LED’s) using a Joystick
• Controlling a DC motor using Pulse Width Modulation
• Fading of LEDs using potentiometers

Chapter 6

LCD displays

• Wiring of LCD screen with Arduino
• Displaying a message in LCD screen
• Screen navigation on LCD
• Turn ON a LED by entering the password
• Knowing the status of the LED
• Scrolling of text
• Displaying room temperature using LM 35 temperature sensor

Chapter 7

Seven segment display

• Simple automatic countdown and count up. (FOR loop)
• Increment or decrement a number by using push button
Chapter 8

Servo/ Stepper motors

- Controlling Servo/Stepper Motor with Joystick
- Direction control of Servo Motor
- Servo Motor based Projects
- Synchronizing 2 Servo Motors

Chapter 9

LabVIEW 2012

Getting Started with LabVIEW

- Introduction to LabVIEW
- Introduction to VI (Virtual Instruments)
- Understanding DAQ (Data Acquisition Cards)

Chapter 10

Fundamentals of LabVIEW

- Understanding LabVIEW Environment
- Building the Front Panel (Concepts & How To?)
- Designing the Block Diagram (Concepts & How To?)
- Running & Debugging VI’s
- Creating VI’s (Concepts & How To?)
- Building VI Applications
- Loops & Structures
- Understanding Data Types – Strings, Arrays & Structures
Chapter 11

Programming VI’s & Functions

- Array Functions, Boolean Functions
- Comparison Functions, Numeric Functions
- String Functions, Timing Functions
- Waveforms & Charts

Chapter 12

Interfacing Arduino with LabVIEW

- Understanding Communication Parameters of Arduino & LabVIEW
- Read/Write Outputs of Arduino
- Reading Analogue & Digital information from Arduino
- Representation of Arduino Signals in Front Panel of LabVIEW
- Graphical Representation of Analogue Value of Arduino
- Controlling Arduino using Front Panel

- Understanding Following Arduino Functions in LabVIEW
  I. Analog Read Pin – Reading the Analog Voltage in Visual Meter
  II. Set Digital Pin Mode – Setting the Input/Output mode by LabVIEW
  III. Digital Read Pin - Reading the feedback of Arduino by LED’s/ Numeric Form
  IV. Digital Write Pin – Turning Outputs ON/OFF by Buttons, Switches etc.
  V. PWM Write Pin – Writing the Values by Dial/ Knob
  VI. Thermistor Read, IR Read – Visual Representation in LabVIEW
  VII. Seven Segment Display
  VIII. LCD Interfacing with LabVIEW- Real Time data Communication

- Home Automation Project using Arduino & LabVIEW
• Building Arduino- LabVIEW Application for Real time application
• Building Smart Projects

Chapter 13

BASIC INDUSTRIAL CONTROL

• **Industrial Drawings** – Industrial Symbols, Schematic Diagrams, Circuit Diagrams
• **Industrial Controls** – Motor Control Timings Circuits, Automatic Fwd/Rev of AC Motor
• **Sensors & Actuators** – Study & Use of Proximity, Limit Switch, Photoelectric, Level Sensors
• **Relay Logic Control Circuits** – Latching & Interlocks
• **PLC Programming** – Logical Commands, Arithmetic Commands, Transmission Commands, Timers & Counters
• **HMI Programming** – Screen Designing, Controlling & Monitoring, Alarm Generation
• **Interfacing of PLC with HMI** – Communication through Rs-485
• **PLC-HMI Industrial Control Applications**
• **Electro- Pneumatic Robotic Arm** – Working on Gripper & Vacuum Based Robotic Arm actuated by PLC & HMI

PLC PROJECT WORK ON:

• On/Off & Direction Control of AC Induction Motor through Limit Switches, Contactors & Relays
• Induction Motor ON/OFF & Direction control using PLC
• PLC Control of DC Motor
• Monitoring & Control of Induction motor using HMI
• PLC Water Level Control
• Electro- Pneumatics Robotic Arm
• PLC Box Sorting System on ITS – Interactive Training System

Following FREE Software’s will be given to students who enrol for this Training:

- Arduino Programming Software
- Arduino Wiring Software - Fritzing
- Arduino Simulator
- Arduino Help books
- LabVIEW FREE Student Evaluation Version
- LabVIEW – Arduino Interface Package
- PLC/HMI Programming Software
Training Methodology:

- 90% Practical Hardware Training
- Industrial Tour at Automation Industry
- FREE NFI Online PLC Course Enrolment worth $19. It offers PLC Videos Tutorial, PLC Presentations, PLC Circuits, Test & E-books. NFI has worldwide Online PLC Training network in countries like US, Brazil, Fiji, Australia, Mauritius, Malaysia, China, Israel, Cambodia, Sri Lanka, UK & Slovakia
- Fully automated Laboratories with latest Automation Facilities from Allen Bradley, Delta, Real Games & Siemens
- Fully loaded DIY (Do it Yourself) Workshop with all necessary mechanical tools to create your project
- Personality Development Classes to enhance interpersonal skills

Training Charges:

Full Course Fee: **Rs 14999/-** including Taxes
Group Discount: 10% on group of 4 or more

Training Duration:

For Regular Classes - 3 Hours Daily (10 pm ~ 1 pm) or (2 pm ~ 5 pm)
For Weekend Classes – 5 Hours Daily (11 am ~ 5 pm) (1 pm ~ 2 pm – Lunch Break)

Note:

1. NFI will provide Hardware Trainer & Notebooks for the candidates
2. Post Training Exam will be conducted for the candidates for their evaluation