

LabVIEW Basics I: Introduction Course

Overview

The LabVIEW Basics I course prepares you to develop test and measurement, data acquisition, instrument control, data logging, and measurement analysis applications using LabVIEW. At the end of LabVIEW Basics I, you can create applications that acquire, process, display, and store real-world data. This course is the fastest way to become productive with LabVIEW. The hands-on format of the course enables you to apply skills learned in the course to your application.

Duration – Three Days

Audience

- New users and users preparing to develop applications using LabVIEW, or NI Developer Suite
- Users and technical managers evaluating LabVIEW or NI Developer Suite in purchasing decisions
- Users pursuing the Certified LabVIEW Developer certification

Prerequisites

- Experience with Microsoft Windows
- Experience writing algorithms in the form of flowcharts or block diagrams

NI Products Used During the Course

- LabVIEW Professional Development System Version 7
- E-Series DAQ board
- IEEE 488.2 (GPIB) board
- DAQ Signal Accessory
- NI Instrument Simulator

REGISTRATION

Register online at ni.com/training or call (800) 433-3488 • Fax: (512) 683-9300
info@ni.com

Outside North America, contact your local NI office. Worldwide Contact Info: ni.com/global

NI can also hold this class onsite at your facility.

Ordering Information 910013-xx

-01 NI Corporate or Branch, -11 Regional, -21 Onsite

After attending this course you will be able to:

- Use LabVIEW to create data acquisition, analysis, and display applications
- Use Express VIs to get started with your application quickly
- Create user interfaces with strip charts, graphs and buttons
- Use the programming structures and data types that exist in LabVIEW
- Use various editing and debugging techniques
- Create and save your own VIs so you can use them as subVIs
- Save your data in files
- Create applications that use plug-in data acquisition (DAQ) boards
- Create applications that use GPIB and serial port instruments

Suggested Next Courses

- LabVIEW Basics II: Development
- LabVIEW Advanced: Performance and Communication
- Data Acquisition and Signal Conditioning
- LabVIEW Instrument Control

LabVIEW Basics I: Introduction Course Outline

Day 1

Introduction to LabVIEW

This lesson introduces the LabVIEW environment. In this lesson, you will develop a complete simulated signal acquisition application using Express VIs which will enable you to fully explore the environment.

Topics include:

- The LabVIEW environment including windows, menus, and tools
- The LabVIEW front panel and block diagram
- Understanding the dataflow programming model of LabVIEW
- Using the LabVIEW help features include the Context Help, the LabVIEW Help and the LabVIEW manuals
- Debugging techniques available in LabVIEW

Modular Programming

This lesson introduces modular programming in LabVIEW. In LabVIEW, when a VI is used within another VI, it is called a subVI. You will learn how to build the icon and connector pane of a VI so that it can be used as a subVI. Topics include

- Basics of modular programming with subVIs
- Creating an icon and connector pane
- Using a VI as a subVI
- Creating subVIs from sections of another VI

Repetition and Loops

This lesson introduces the While Loop and the For Loop structures, along with functions commonly used with these structures, including the shift register and the Feedback Node. Structures are graphical representations of the loops and case statements of text-based programming languages. Use structures in the block diagram to repeat blocks of code and to execute code conditionally or in a specific order. Topics include:

- Using a While Loop
- Using a For Loop
- Accessing the data from previous loop iterations using shift registers and Feedback Nodes

Arrays

This lesson describes how to use arrays to group data elements of the same type. Array techniques are important when you work with a collection of similar data or when you perform repetitive computations. Arrays are ideal for storing data you collect from waveforms or data generated in loops. Topics include:

- Understanding arrays
- Creating arrays with loops
- Using the array functions
- How polymorphism applies to various LabVIEW functions

Day 2

Clusters

This lesson describes how to use clusters to group data elements of mixed data types. You will learn when it is appropriate to use a cluster rather than an array to group data together. In the second part of this lesson, you will learn the foundations of error handling in LabVIEW VIs. Topics include:

- Understanding clusters
- Utilizing the cluster functions
- Error clusters

Plotting Data

This lesson describes how to display data on waveform charts, waveform graphs, XY graphs, and intensity graphs. You will learn which type of graph to use for different types of data and how to set the properties for graphs. Topics include:

- Using waveform charts to display data
- Using waveform and XY graphs to display data
- Intensity graphs

Decision Making in a VI

This lesson introduces methods for making simple and complex decisions in a VI. These methods allow you to choose a course of action dependant on the result of a previous action. Topics include:

- Simple decision making with the Select function
- Using case structures for more complex decision making
- Using the formula node to perform text-based programming, such as an if-then statement

Strings and File I/O

This lesson describes the string and file I/O capabilities of LabVIEW. Strings group sequences of ASCII characters – arrays of ASCII characters. File I/O operations pass data to and from files. Topics include:

- Creating string controls and indicators
- Using several string functions
- File I/O operations
- Using the high-level File I/O VIs
- Using low-level File I/O VIs
- Formatting text files for use in spreadsheets

Day 3

Data Acquisition and Waveforms

This lesson describes how to use plug-in data acquisition (DAQ) devices in LabVIEW. You will learn how to write a VI that communicates with DAQ devices. You will also learn how to log data to file. Topics include:

- Plug-in DAQ devices
- Data acquisition in LabVIEW
- Performing analog input
- Storing acquired data and average and log the acquired data to disk
- Performing analog output
- Counters
- Digital I/O

Instrument Control

This lesson describes how you can use LabVIEW to control and acquire data from external GPIB and serial port instruments. You learn how to use VISA, LabVIEW Plug & Play instrument drivers, and the Instrument I/O Assistant to perform instrument I/O. Topics include:

- Instrument control
- GPIB communication and configuration
- Using the Instrument I/O Assistant
- VISA
- LabVIEW instrument drivers
- Using instrument driver VIs to communicate with an instrument
- Serial communication
- Waveform transfers

VI Customization

This lesson describes how to configure the appearance and behavior of VIs and the LabVIEW environment. Topics include:

- Configuring the appearance of the front panel
- Opening subVI front panels when a VI runs
- Using and assigning keyboard shortcuts
- Editing VIs with custom VI properties
- Customizing palette views