

# LabVIEW Basics II: Development Course

## Overview

The LabVIEW Basics II course teaches you to design complete, stand-alone applications with LabVIEW. This course is an extension of the LabVIEW Basics I course and introduces you to common design techniques for successfully implementing and distributing LabVIEW applications for research, engineering, and testing environments. Topics covered include techniques for optimizing application performance including how to optimize reuse of existing code, use of advanced file I/O functions, data management principles, and error handling practices. This course directly links LabVIEW functionality to your application needs and provides a jump-start for application development.

## Duration

Two Days

## Audience

- New LabVIEW or NI Developer Suite users and users preparing to develop applications
- LabVIEW Basics I course attendees
- Users and technical managers evaluating LabVIEW or NI Developer Suite in purchasing decisions
- Users pursuing the Certified LabVIEW Associate Developer certification

## Prerequisites

- Experience with Microsoft Windows
- LabVIEW Basics I: Introduction course or equivalent experience

## NI Products Used During the Course

- LabVIEW Professional Development System Version 8.6
- NI data acquisition devices
- DAQ Signal Accessory

## After attending this course, you will be able to:

- Design, implement, and distribute stand-alone applications using LabVIEW
- Apply single and multiple loop design patterns for application functionality
- Implement event-driven programming
- Create applications that have a professional look and feel
- Programmatically control user interface objects
- Apply data management techniques in your application design

## Registration

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

Outside North America, contact your local NI Office.  
Worldwide Contact Info: [ni.com/global](http://ni.com/global)

## Part Number

910017-xx  
-01 NI Corporate or Branch  
-11 Regional  
-21 Onsite (at your facility)

- Optimize reuse of existing code for your projects
- Use the LabVIEW Application Builder to create executables and installers to distribute applications

## Suggested Next Courses

- LabVIEW Intermediate I: Successful Development Practices
- Data Acquisition and Signal Conditioning
- LabVIEW Instrument Control
- LabVIEW Modular Instruments

## Recommended Certification

- Certified LabVIEW Associate Developer Certification

# LabVIEW Basics II: Development Course Outline

## Day 1

### Communicating Between Multiple Loops

This lesson describes two different categories of programming architectures: single and multiple loop architectures. You will learn the specific benefits and functionality of these design patterns and how they can be used to reduce development time. Topics include:

- Single loop architectures – simple VI, general VI, and the state machine design patterns
- Multiple loop architectures – parallel loop, master/slave, and producer/consumer design patterns
- Events
- Adding timing to a design pattern

### Communicating Between Multiple Loops

This lesson describes techniques for transferring data between multiple loops using variables, notifiers, and queues in LabVIEW. You will also learn about the programming challenges involved in using these techniques and methods for overcoming these challenges. Topics include:

- Using local and global variables
- Implementing functional global variables
- Identifying and controlling race conditions - semaphores
- Synchronizing data transfer – notifiers and queues

### Event Programming

This lesson describes event-driven programming using the Event structure and design patterns that use the Event structure. Topics include:

- Event-driven programming
- Event-based design patterns

### Controlling the User Interface

This lesson describes methods to control the attributes of front panel objects programmatically like for example making an object invisible until a certain point in the execution of the program. You will learn how to use VI Server to access the properties and methods of front panel objects. Topics include:

- VI server architecture
- Property nodes
- Control references
- Invoke nodes

## Day 2

### Advanced File I/O Techniques

This lesson describes different file formats for collecting and storing data and how to select the appropriate file format for your applications. Topics include:

- File formats
- Binary files
- Technical data management streaming (TDMS) files

### Improving an Existing VI

This lesson focuses on methods to refactor inherited LabVIEW code and how to maximize reuse of existing code. Refactoring is the process of redesigning software to make it more readable and maintainable without altering its observable behavior. Topics include:

- Refactoring inherited code
- Typical issues when refactoring code

### Creating and Distributing Applications

This lesson describes the process of creating stand-alone executables and installers for LabVIEW applications. You will learn how to use the Application Builder in LabVIEW. Topics include:

- LabVIEW features for project development
- Preparing the application
- Building the application and installer