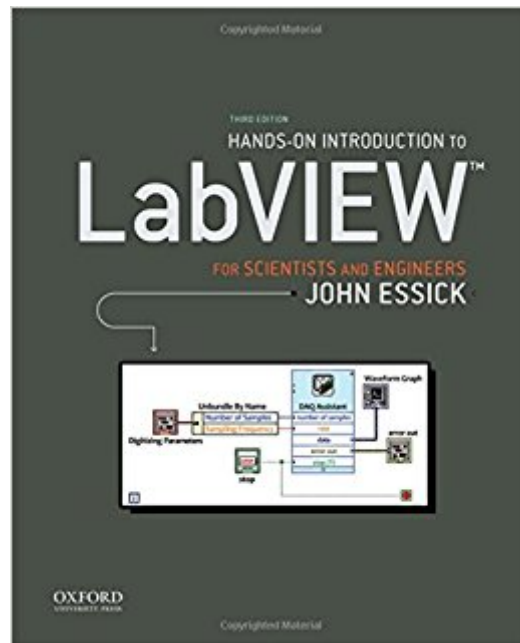




**Ebook Directory**  
the best source of ebook

The book was found

# Hands-On Introduction To LabVIEW For Scientists And Engineers



## Synopsis

Hands-On Introduction to LabVIEW for Scientists and Engineers, Third Edition, explores practical programming solutions for carrying out interesting and relevant projects. Readers--who are assumed to have no prior computer programming or LabVIEW background--will begin writing meaningful programs in the first few pages. Improvements to the Third Edition: This new edition includes the following improvements: \* All chapters are fully updated to the latest version of LabVIEW. DAQ hardware now commonly used in instructional laboratories and self-learning is highlighted. \* For easy reference, seven chapters begin with a "Basics" section that explains the fundamental operation of the LabVIEW function covered in that chapter [Chapters 2, 3, 4, 7, 8, 9, 12]. \* A new first chapter offers focused introduction to the LabVIEW programming environment. Readers construct a simple program to detect whether a given integer is even or odd [Chapter 1]. \* Coverage of LabVIEW's text-based functions is given for both the MathScript Node and Formula Node [Chapter 4 and Appendix A]. \* Shift register usage is illustrated through a signal-averaging program (replacing the numerical integration and differentiation programs used in previous editions) [Chapter 7]. \* State machine program architecture is now taught in the case structure chapter (replacing the numerical integration program used in previous editions). Readers construct a state-machine guessing game and a digital oscilloscope with runtime control [Chapter 8]. \* A nonlinear curve fitting example is included in the text [Chapter 10]. \* The fast Fourier transform chapter opens with an Express VI-based "Quick Example" section, which gives a concise introduction to the digital spectral analysis topics of leakage and windowing. High-level mathematical coverage of these topics is moved to an appendix [Chapter 11 and Appendix B]. \* The proportional-integral-derivative temperature control project is now given in an appendix [Appendix C]. \* About 20 new end-of-the-chapter problems appear throughout the book. More information about this book can be found here:

[reed.edu/physics/faculty/essick/labview.html](http://reed.edu/physics/faculty/essick/labview.html)  
[global.oup.com/academic/product/hands-on-introduction-to-labview-for-scientists-and-engineers-9780190211899?cc=us&lang=en&#](http://global.oup.com/academic/product/hands-on-introduction-to-labview-for-scientists-and-engineers-9780190211899?cc=us&lang=en&#)

## Book Information

Paperback: 688 pages

Publisher: Oxford University Press; 3 edition (May 27, 2015)

Language: English

ISBN-10: 019021189X

ISBN-13: 978-0190211899

Product Dimensions: 9.2 x 1 x 7.5 inches

Shipping Weight: 2.4 pounds (View shipping rates and policies)

Average Customer Review: 4.3 out of 5 stars 16 customer reviews

Best Sellers Rank: #39,752 in Books (See Top 100 in Books) #2 in Books > Science & Math > Experiments, Instruments & Measurement > Microscopes & Microscopy #27 in Books > Engineering & Transportation > Engineering > Electrical & Electronics > Circuits #44 in Books > Textbooks > Computer Science > Graphics & Visualization

## Customer Reviews

"The hands-on method really allows students to learn the material in sufficient depth. I know of no other book that comes even close."--Mark Beck, Whitman College  
"This book is exactly what I need to fill gaps in student understanding of LabVIEW."--Eric Ayars, California State University, Chico  
"This text is the most comprehensive and readable book available for LabVIEW."--Ladimer S. Nagurney, University of Hartford

TABLE OF CONTENTS Each chapter ends with "Do It Yourself" and "Problems" sections. Preface  
1. LABVIEW PROGRAM DEVELOPMENT 1.1 LabVIEW Programming Environment 1.2 Blank VI 1.3 Front-Panel Editing 1.4 Block-Diagram Editing 1.5 Program Execution 1.6 Pop-Up Menu and Data-Type Representation 1.7 Program Storage 1.8 Quick Drop  
2. THE WHILE LOOP AND WAVEFORM CHART 2.1 Programming Structures and Graphing Modes 2.2 While Loop Basics 2.3 Sine-Wave Plot Using a While Loop and Waveform Chart 2.4 LabVIEW Help Window 2.5 Front Panel Editing 2.6 Waveform Chart Pop-Up Menu 2.7 Finishing the Program 2.8 Program Execution 2.9 Program Improvements 2.10 Data Types and Automatic Creation Feature  
3. THE FOR LOOP AND WAVEFORM GRAPH 3.1 For Loop Basics 3.2 Sine-Wave Plot Using a For Loop and Waveform Graph 3.3 Waveform Graph 3.4 Owned and Free Labels 3.5 Creation of Sine Wave Using a For Loop 3.6 Cloning Block-Diagram Icons 3.7 Auto-Indexing Feature 3.8 Running the VI 3.9 X-Axis Calibration of the Waveform Graph 3.10 Sine-Wave Plot Using a While Loop and Waveform Graph 3.11 Front-Panel Array Indicator 3.12 Debugging With the Probe-Watch Window and Error List  
4. THE MATHSCRIPT NODE AND XY GRAPH 4.1 Mathscript Node Basics 4.2 Quick Mathscript Node Example: Sine-Wave Plot 4.3 Waveform Simulator Using a Mathscript Node and XY Graph 4.4 Creating an XY Cluster 4.5 Running the VI 4.6 LabVIEW Mathscript Window 4.7

Adding Shape Options Using an Enumerated Type Control    4.8 Finishing the Block Diagram    4.9 Running the VI    4.10 Control and Indicator Clusters    4.11 Creating an Icon Using the Icon Editor    4.12 Icon Design    4.13 Connector Assignment

## 5. DATA ACQUISITION USING DAQ ASSISTANT

5.1 Data Acquisition VIs    5.2 Data Acquisition Hardware    5.3 Analog Input Modes    5.4 Range and Resolution    5.5 Sampling Frequency and the Aliasing Effect    5.6 Measurement & Automation Explorer (MAX)    5.7 Simple Analog Input Operation on a DC Voltage    5.8 Digital Oscilloscope    5.9 Analog Output    5.10 DC Voltage Source    5.11 Software-Timed Sine-Wave Generator    5.12 Hardware-Timed Waveform Generator    5.13 Placing a Custom-Made VI on a Block Diagram    5.14 Completing and Executing Waveform Generator (Express)    5.15 Modified Waveform Generator

## 6. DATA FILES AND CHARACTER STRINGS

6.1 ASCII Text and Binary Data Files    6.2 Storing Data in Spreadsheet-Formatted File    6.3 Storing a One-Dimensional Data Array    6.4 Transpose Option    6.5 Storing a Two-Dimensional Data Array    6.6 Controlling the Format of Stored Data    6.7 The Path Constant and Platform Portability    6.8 Fundamental File I/O VIs    6.9 Adding Text Labels to a Spreadsheet File    6.10 Backslash Codes

## 7. SHIFT REGISTERS

7.1 Shift Register Basics    7.2 Quick Shift Register Example: Integer Sum    7.3 Noise and Signal Averaging    7.4 Noisy Sine VI    7.5 Moving Average of Four Traces    7.6 Modularity and Automatic SubVI Creation    7.7 Moving Average of Arbitrary Number of Traces

## 8. THE CASE STRUCTURE

8.1 Case Structure Basics    8.2 Quick Case Structure Example: Runtime Options Using Property Nodes    8.3 State Machine Architecture: Guessing Game    8.4 State Machine Architecture: Expressed VI-Based Digital Oscilloscope

## 9. DATA DEPENDENCY AND THE SEQUENCE STRUCTURE

9.1 Data Dependency and Sequences Structure Basics    9.2 Event Timer Using a Sequence Structure    9.3 Event Timer Using Data Dependency    9.4 Highlight Execution

## 10. ANALYSIS VIs: CURVE FITTING

10.1 Thermistor Resistance-Temperature Data File    10.2 Temperature Measurement Using Thermistors    10.3 The Linear Least-Squares Method    10.4 Inputting Data to a VI Using a Front-Panel Array Control    10.5 Inputting Data to a VI by Reading from a Disk File    10.6 Slicing Up a Multi-Dimensional Array    10.7 Running the VI    10.8 Curve Fitting Using the Linear Least-Squares Method    10.9 Residual Plot    10.10 Curve Fitting Using the Nonlinear Least-Squares Method

## 11. ANALYSIS VIs: FAST FOURIER TRANSFORM

11.1 Quick Fast Fourier Transform Example    11.2 The Fourier Transform    11.3 Discrete Sampling and the Nyquist Frequency    11.4 The Discrete Fourier Transform    11.5 The Fast Fourier Transform    11.6 Frequency Calculator VI    11.7 FFT of Sinusoids    11.8 Applying the FFT

to Various Sinusoidal Inputs    11.9 Magnitude of Complex-Amplitude    11.10 Observing Leakage    11.11 Windowing    11.12 Estimating Frequency and Amplitude    11.13 Aliasing

12. DATA ACQUISITION AND GENERATION USING DAQMX VIs    12.1 DAQmx VI Basics    12.2 Simple Analog Input Operation on a DC Voltage    12.3 Digital Oscilloscope    12.4 Express VI Automatic Code Generation    12.5 Limitations of Express VIs    12.6 Improving Digital Oscilloscope Using State Machine Architecture    12.7 Analog Output Operations    12.8 Waveform Generator

13. CONTROL OF STAND-ALONE INSTRUMENTS    13.1 Instrument Control using VISA VIs    13.2 The VISA Session    13.3 The IEEE 488.2 Standard    13.4 Common Commands    13.5 Status Reporting    13.6 Device-Specific Commands    13.7 Specific Hardware Used In This Chapter    13.8 Measurement & Automation Explorer(MAX)    13.9 Simple VISA-Based Query Operation    13.10 Message Termination    13.11 Getting and Setting Communication Properties Using a Property Node    13.12 Performing a Measurement over the Interface Bus    13.13 Synchronization Methods    13.14 Measurement VI Based on the Serial Poll Method    13.15 Measurement VI Based on the Service Request Method    13.16 Creating an Instrument Driver    13.17 Using the Instrument Driver to Write an Application Program

APPENDIX A. FORMULA NODE PROGRAMMING FOR CHAPTER 4    A.1 Formula Node Basics    A.2 Quick Formula Node Example: Sine-Wave Plot (Section 4.2)    A.3 Formula Node-Based Waveform Simulator (Sections 4.3-4.4)    A.4 Formula Node-Based Waveform Simulator (Section 4.8)    A.5 Formula Node-Based Waveform Simulator (Section 4.10)

APPENDIX B. MATHEMATICS OF LEAKAGE AND WINDOWING    B.1 Analytic Description of Leakage    B.2 Description of Leakage Using the Convolution Theorem

APPENDIX C. PID TEMPERATURE CONTROL PROJECT    C.1 Project Description    C.2 Voltage-Controlled Bidirectional Current Driver for Thermoelectric Device    C.3 PID Temperature Control Algorithm    C.4 PID Temperature Control System    C.5 Construction of Temperature Control System

Index

This book so far has been very helpful. It has a lot of condensed information with projects associated with topics. I have been able to practice all of the projects using my NI LabVIEW Home edition so far. If your just starting out with LabVIEW and you have no other history with it, NI's Core learning books are going to have the greatest initial impact. I feel this book in conjunction with the LabVIEW Core learning books will prove to be a powerful tool that will boost your learning and get you up to speed faster. However, If you only have this book and are starting from scratch with absolutely no prior knowledge of LabVIEW, you may find your self learning at a slower pace. NI

sells there Core learning books and Certifications courses on the NI website. Good luck in your LabVIEW journey.

Great book for LabVIEW reference. 3 stars for no color! I am a visual learner and reading is very difficult for me. Even though the book does read well compared to text books the lack of color is really a silly oversight for this kind of publication, but the contents are relevant if you use LabVIEW.

This book seems to be a good book to start if you want to learn LabVIEW since most of people had offered positive comments about it. After skimming through the book, I do agree that the positive comments offered by the previous readers were indeed not overexaggerated!

A great book to help you get started. It is well written, very accurate and precise about each step you have to take to build up an example. Definitely worth!

I have been doing labview for more than 10 years, I bought many books to help in using it, this book is truly the best ever, very user friendly and excellent to follow. Learned a lot from this book than any other. I wish I had this when I got started in labview. I just finished chapter 10, will definitely reread this book when finished.

Excellent book, especially for beginners. Some projects are very easy to do, however the book is taking you step by step. I guess most of the exercises are part of the Core 1 from NI.

This is a very good book for someone who is taking a class or programmer who would like to learn LabVIEW. It is easy to read and does not bore you with useless extra text.

The examples provided and the problems that can be completed give hands-on experience in applying the coding objects which can be linked together to form useful measurement and control software for laboratory work.

[Download to continue reading...](#)

Hands-On Introduction to LabVIEW for Scientists and Engineers  
Physics for Scientists and Engineers: Vol. 2: Electricity and Magnetism, Light (Physics, for Scientists & Engineers, Chapters 22-35)  
Physics for Scientists and Engineers with Modern Physics: Volume II (3rd Edition) (Physics for Scientists & Engineers)  
Advice to Rocket Scientists: A Career Survival Guide for Scientists and

Engineers (Library of Flight) Introduction to Probability and Statistics for Engineers and Scientists, Fifth Edition Introduction to Probability and Statistics for Engineers and Scientists Introduction to High Performance Computing for Scientists and Engineers (Chapman & Hall/CRC Computational Science) Introduction to C++ for Engineers and Scientists (Prentice Hall Modular Series for Engineering) Interfacing LabVIEW and Arduino using LINX: Learn in a day LabVIEW Graphical Programming Cookbook Learning with LabVIEW 8 LabVIEW 7 Express Student Edition LabVIEW 2009 Student Edition Mathematical Handbook for Scientists and Engineers: Definitions, Theorems, and Formulas for Reference and Review (Dover Civil and Mechanical Engineering) Physics for Scientists and Engineers, Hybrid (with Enhanced WebAssign Homework and eBook LOE Printed Access Card for Multi Term Math and Science) Bundle: Physics for Scientists and Engineers: Foundations and Connections, Advance Edition, Loose-leaf Version + WebAssign Printed Access Card for ... and Connections, 1st Edition, Multi-Term Probability and Statistics for Engineers and Scientists Successful Women Ceramic and Glass Scientists and Engineers: 100 Inspirational Profiles Electronics and Communications for Scientists and Engineers C++ and Object-Oriented Numeric Computing for Scientists and Engineers

[Contact Us](#)

[DMCA](#)

[Privacy](#)

[FAQ & Help](#)