

Data Acquisition Using NI-DAQmx and Python Course Overview

2 Days

DURATION

10

MODULES

52

TOPICS

910987-71 | 910987-69 | 910987-11

COURSE CODE

COURSE OVERVIEW

In the Data Acquisition Using NI-DAQmx and Python Course, you will explore the fundamentals of data acquisition using sensors, NI data acquisition hardware, and Python.

WHO THIS COURSE IS FOR

- Developers using Python with NI data acquisition hardware to create data acquisition applications
- Users familiar with the DAQ Assistant or basic NI-DAQmx code that want to expand their programming capabilities
- Users new to PC-based data acquisition and signal conditioning

PREREQUISITES

- Required basic knowledge of Python
- If you take the course On-Demand:
 - NI-DAQmx 2025 Q3
- If you take the course in an instructor-led format:
 - NI-DAQmx 2025 Q3
 - CompactDAQ Chassis
 - C Series analog input, analog output, and digital I/O modules

LEARNING OBJECTIVES

What You Will Learn

- Develop integrated, high-performance data acquisition systems that produce accurate measurements
- Acquire data from sensors, such as thermocouples and strain gages, using NI data acquisition hardware
- Apply advanced understanding of Python and the NI-DAQmx API to create applications
- Eliminate measurement errors due to aliasing and incorrect signal grounding
- Initiate measurements using hardware and software triggering
- Acquire and generate single-point and buffered analog waveforms

- Acquire and generate digital signals
- Use signal conditioning to improve the quality of acquired signals
- Synchronize multiple data acquisition operations and devices

COURSE SYLLABUS

10 Modules, 52 Topics

01

Measuring an Analog Signal

TOPICS

- Select and connect to the hardware, configure the DAQmx task appropriately, and validate an analog signal.
- Simulating the Hardware
- Selecting the Right Hardware
- Considering Signal Conditioning
- Connecting the Signal
- Validating the Measurement
- Measuring Current

02

Generating an Analog Signal

TOPICS

- Select and connect to the hardware, configure the DAQmx task appropriately, and validate an analog signal.
- Selecting the Hardware
- Connecting the Signal
- Validating the Signal
- Generating Current

03

Generating and Reading a Digital Signal

TOPICS

- Select and connect hardware, configure a task appropriately, and validate a measurement or the generation of a digital signal.
- Selecting the Hardware
- Exploring Signal Conditioning
- Connecting the Signal
- Validating the Signal
- Exploring Counter Signals

04

Choosing a Signal to Explore

TOPICS

- Choose a specific signal and configure the DAQmx task, including any special signal conditioning needs.
- Measuring Temperature
- Measuring Sound, Vibration, and Acceleration (IEPE Measurements)
- Measuring Strain, Force, and Pressure (Bridge-Based Measurements)
- Measuring Position with Encoders (Counter Input)
- Measuring Edges, Frequency, Pulse Width, and Duty Cycle
- Generating a Pulse Train

05

Programming with NI-DAQmx API

TOPICS

- Use the NI-DAQmx Python API to automate data communication between a DAQ device and a computer.
- DAQmx Code Structure Overview
- Reading and Writing a Finite Amount of Data
- Communicating Data Continuously

06

Programming Multiple Channels

TOPICS

- Explore various methods for multi-channel task creation and their applications.
- Communicating with Multiple Channels
- Creating Multidevice Tasks
- Creating Multitask Scripts

07

Triggering on a Specific Condition

TOPICS

- Acquire data on a specific condition and explore how to use hardware sources as triggers.
- Triggering Overview
- Exploring Hardware Trigger Types
- Identifying Hardware Trigger Sources

08

Exploring Advanced Timing and Synchronization Methods

TOPICS

- Use an appropriate method for synchronizing multiple DAQ tasks.
- Synchronization Overview
- Synchronizing a Single Device with a Shared Trigger
- Identifying Limitations of Shared Trigger Synchronization
- Synchronizing Multiple Devices
- Synchronizing Specific Hardware Series

09

Logging Measurement Data to Disk

TOPICS

- Log data to a TDMS file to store and analyze post-acquisition.
- TDMS File Overview
- Logging Data with the DAQmx API
- Organizing the TDMS Data
- Viewing the TDMS Data

10

Exploring System Considerations

TOPICS

- Explore additional aspects of building a data acquisition system.
- Exploring System Considerations for Hardware
- Determining the Accuracy of a System
- Exploring Bus and Computer Considerations

DELIVERY NOTE

How It Is Delivered

- Virtual instructor-led training includes digital course material that is delivered through the NI Learning Center
- NI virtual instructor-led training is delivered through Zoom, and Amazon AppStream/LogMein access is provided to participants to perform the exercises on virtual machines equipped with the latest software
- On-demand training includes digital course materials delivered through the NI Learning Center, available for the access duration of your subscription

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

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Flexi (Self-Paced)

1-on-1 Training

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