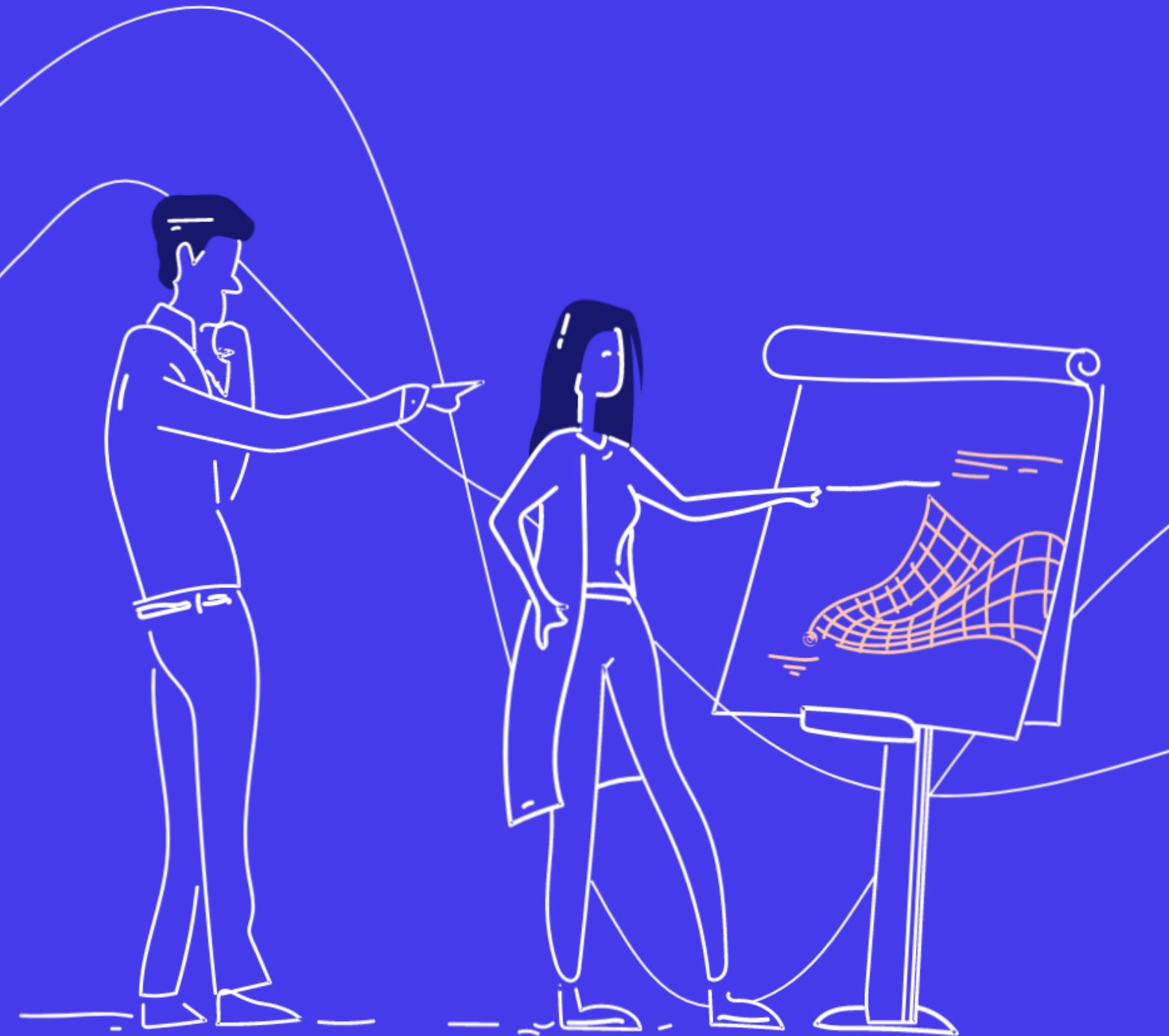




Real-Time Testing with Simulink Real-Time and Speedgoat Hardware



SciEngineer's training courses are designed to help organizations and individuals close skills gaps, keep up-to-date with the industry-accepted best practices and achieve the greatest value from MathWorks® and COMSOL® Products.

Real-Time Testing with Simulink Real-Time and Speedgoat Hardware

This two-day course focuses on real-time testing workflows using Simulink Real-Time and Speedgoat real-time target computers.

Topics include: Converting desktop-based simulation applications into real-time applications; Conducting rapid control prototyping with physical device under control; Creating interactive interfaces and formal test suites, Using standard communication protocols; Optimizing real-time applications and hardware-in-the-loop testing.

Prerequisites

- Simulink Fundamentals (or Simulink Fundamentals for Automotive Applications or Simulink Fundamentals for Aerospace Applications)
- Knowledge of Simscape™ preferred

A dark blue rounded rectangle containing course metadata. It is divided into two columns by a vertical line. The left column is labeled 'DURATION' and shows '2 Days' with three circles below it (two orange, one black). The right column is labeled 'LEVEL' and shows 'Advanced' with three orange bars below it.

DURATION	LEVEL
2 Days	Advanced
● ● ●	▬ ▬ ▬

TOPICS

Day 1

- Workflow Overview
- Developing Real-Time Applications
- Building Interactive Interfaces

Day 2

- Automating Real-Time Tests
- Using Communications Protocols
- Optimizing Plant Models for Real-Time Execution
- Hardware-in-the-Loop Testing

Workflow Overview

OBJECTIVE: Set up the real-time testing hardware and test communications between host and target computers.

- Real-time testing overview
- Setting up the host and target computers
- Running a real-time application
- Tuning parameters
- Monitoring and visualizing Signals
- Creating a standalone application

Developing Real-Time Applications

OBJECTIVE: Use Speedgoat driver blocks to convert a desktop-based test bench to an RCP application.

- Permanent magnetic synchronous motor (PMSM) hardware introduction
- Converting plant models into plant hardware interfaces
- Implementing Speedgoat I/O drivers
- Testing sensors and actuators
- Executing closed-loop real-time simulations with physical hardware
- Using Simulink Dashboard blocks
- Buffering signals

Building Interactive Interfaces

OBJECTIVE: Use App Designer to create interactive user interfaces to a real-time application.

- Arranging user interface components
- Performing real-time application tasks
- Visualizing signals
- Tuning parameters

Automating Real-Time Tests

OBJECTIVE: Use Simulink Test to create and execute an automated test suite.

- Building a harness for automated testing
- Creating test sequences
- Iterating input and parameter sets
- Analyzing test results
- Automating real-time tests with MATLAB

Using Communications Protocols

OBJECTIVE: Configure IO blocks to interface the target machine with standard communication protocols.

- Simulink Real-Time protocol support
- Real-time UDP
- I2C loopback testing

Optimizing Plant Models for Real-Time Execution

OBJECTIVE: Use the desktop model to validate model fidelity with respect to optimization considerations, and optimize the plant model to execute on target hardware.

- Measuring plant model accuracy
- Analyzing real-time performance
- Optimizing model solvers
- Evaluating alternative implementations

Hardware-in-the-Loop Testing

OBJECTIVE: Convert a simulation test bench into a HIL testing configuration, and use a real-time plant model to validate system requirements.

- Hardware-in-the-loop (HIL) workflow overview
- Running the controller algorithm on production hardware
- Setting up a HIL system
- Running HIL tests



**Expand your
knowledge**

