QUANSER
INNOVATE · EDUCATE

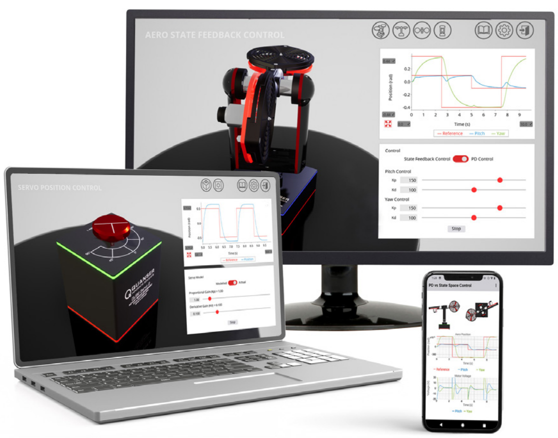
QLABS CONTROLS

Interactive, high-fidelity virtual hardware experiences via desktop or smart devices.

QLabs Controls is a scalable platform capable of delivering credible, academically appropriate, and high-fidelity lab experiences through interactions with virtual hardware. QLabs Controls is based on Quanser QUBE-Servo 2 and Quanser AERO physical plants, and is accompanied by comprehensive curriculum covering topics such as modelling, speed and position control, and aerospace control, instructor resources, and tools to manage students' access and monitor their progress.

QLabs Controls is available as a 12-month subscription and runs on Windows, macOS, iOS, and Android with no need for any institutional IT infrastructure or resources to integrate the platform.

Features



Credible

High-fidelity, academically appropriate experiences

Scalable

Flexible 12-month subscription with up to 300 seats

Cross-platform

Available on Windows, macOS, iOS, and Android

Comprehensive Resources

Curriculum with assessment questions and lab reporting, instructor resources, tools to monitor students' progress

Subscription Details

	QLabs Controls	**QLabs Controls: Premier**
Curriculum Modules	15	15
Hours of Lab Exercises	30+	30+
Subscription Duration	12 months	12 months
Seats	Up to 300	Unlimited
Instructor Resources	✓	✓
Analytics Tools	✓	✓
Access to New Curriculum Modules	✓	✓
Priority Support		✓
Includes QLabs Virtual QUBE-Servo 2 and QLabs Virtual Quanser AERO		✓
Additional Curriculum Topics		50+
Hardware Discount Incentive*	QUBE-Servo 2 or Quanser AERO	QUBE-Servo 2 or Quanser AERO

* Hardware discount valid only when purchased together with qualifying subscriptions.

Courseware

QUBE-Servo 2

DC Motor:

Modelling
- Experimental DC motor modelling
- First principles models vs real hardware
- Significance of the time constant and gain in a TF
- Non-linear behavior in a DC moto

Position Control
- Proportional position control
- Derivative control
- Theoretical and actual control implementation

Speed Control
- Proportional speed control
- Steady state error
- Magic of integral gains
- Noise considerations
- Low-pass filtering and control considerations

Lead Control
- Lead/lag compensator design
- Bode plots

Stability Analysis
- Stable, marginally stable, and unstable systems
- Stability analysis from poles
- Bound-input Bounded-Output (BIBO) stability

Parameter Identification
- Experimental identification of motor parameters
- Obtaining motor transfer function
- Unmodeled dynamics

Steady-state Error
- Evaluating steady-state error due to step and ramp inputs
- System types
- Motor position control
- Proportional integral derivative (PID) control
- Unmodeled dynamics

Inverted Pendulum:

Moment of Inertia
- Finding the moment of inertia

Pendulum Modelling
- Modelling a rotary pendulum from first principles
- Linearization
- State-space modelling

Crane Control
- State-feedback control
- Pole-placement
- Control design for high-order systems

Pendulum Balance Control
- Optimal control using linear quadratic regulator
- Bryson's rule

Quanser AERO

Qualitative PID Control
- Qualitative PID tuning a simple aerospace system

Gain Scheduling
- Non-linear dynamics
- Non-linear controls
- Gain scheduling
- Integral wind-up

State-feedback vs PID Control of a Helicopter
- PID control of a complex coupled aerospace system
- State-space representation
- State-feedback control

Optimal Control of a Half-Quadcopter
- State-feedback control
- LQR design
- Bryson's rule

Product Details

App Download Access to Subscription Management and Analytics Tools	Direct from Quanser Academic Portal
App Compatibility	Windows 10, 64-bit macOS Mojave or later Android 5 or later, compatible with phones,tablets and supported Chromebooks iOS 11.3 or later, compatible with iPhone, iPad, and iPod touch

About Quanser:
For 30 years, Quanser has been the world leader in innovative technology for engineering education and research. With roots in control, mechatronics, and robotics, Quanser has advanced to the forefront of the global movement in engineering education transformation in the face of unprecedented opportunities and challenges triggered by autonomous robotics, IoT, Industry 4.0, and cyber-physical systems.