

QUANSER ROBOTICS PACKAGE FOR EDUCATION

An affordable 4 DOF serial manipulator, multi-seat simulation, and courseware package for hands-on introduction to robotics.

IDEAL SOLUTION FOR YOUR UNDERGRADUATE ROBOTICS LAB

Today's generation of engineering students often enter university with extensive exposure to robotics. Through competitions such as FIRST Robotics, they have had an opportunity to study and apply various robotic principles. Your undergraduate lab, though, needs to take students further. In order to prepare for advanced robotics research and industrial careers, students need to master rigorous concepts and complement theoretical knowledge with hands-on skills. With the Quanser Robotics Package for Education you can reach these goals. The high-end yet affordable robotic manipulator makes your lab relevant to real-world applications. With multiple simulation and 3D visualization seats you can accommodate more students and extend the learning beyond the lab. Plus the modular courseware makes it easy for you to align the provided lab exercises with your course content, and save time when building a robotics course from scratch.

WHAT'S IN THE PACKAGE

The Quanser Robotics Package for Education consists of:

- **High-end Serial Manipulator**

The stand-alone 4 DOF serial manipulator with two-finger gripper by Kinova is customized exclusively for Quanser customers. Quanser technology enables you to access joint angle, motor current and torque measurements for each joint in real time. The robotic manipulator is compact and safe to work with, which makes it an ideal tool for undergraduate robotics labs.

- **Real-time Control Software**

Ten QUARC® control software license enable real-time control algorithm implementation on a physical system without the need for hand-coding, hardware integration, or mastering a proprietary programming language. Quanser's QUARC is fully integrated with MATLAB®/Simulink®.

- **Simulation and 3D Visualization**

Ten simulation and 3D visualization seats allow students to perform lab exercises without the actual robotic manipulator. Students can experiment offline, even outside the lab and then efficiently deploy controllers on the physical system. This also means you can engage a larger number of students, without an extra burden on your budget.



System specifications on reverse page.

QUANSER ROBOTICS PACKAGE FOR EDUCATION COMPONENTS:

- 4 DOF serial manipulator with two-finger gripper
- RS-485 serial card*
- QUARC real-time control software for MATLAB®/Simulink® (ten licenses)
- Course resources with simulation and 3D visualization for ten workstations, including Instructor and Student Workbooks and pre-designed controllers for simulated and actual robotic manipulator
- User Manual (provided in digital format)

- **Course Resources**

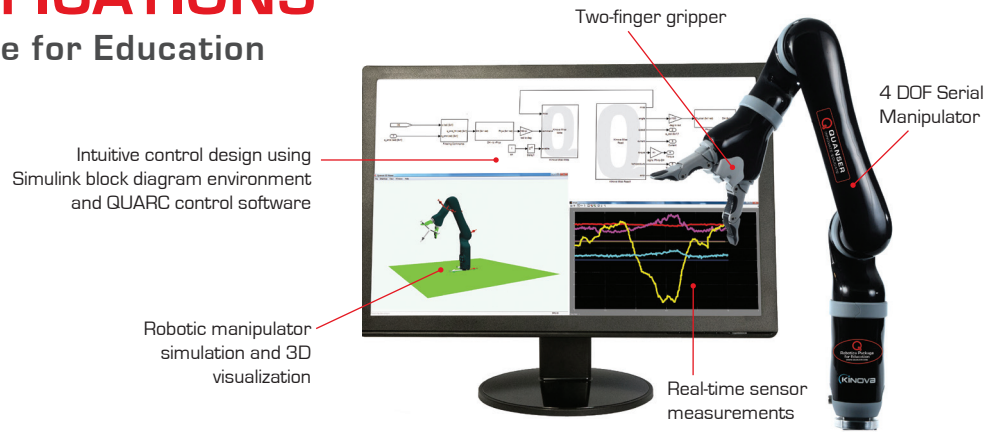
Extensive course resources cover topics included in most popular robotics textbooks, and taught in typical undergraduate robotics courses, such as:

- Forward Kinematics
- Inverse Kinematics
- Jacobian and Forward Velocity Kinematics
- Inverse Velocity Kinematics
- Motion Control and Trajectory Design (task mode, joint mode)

The course resources are provided in a mix-and-match, rich-media format, allowing you to easily adapt materials and lab exercises for existing courses, and customize the lab experiment sequence. Additional application lab content enhances students' experience by putting lab experiments into a real-world, industrial context.

SYSTEM SPECIFICATIONS

Quanser Robotics Package for Education



CURRICULUM TOPICS PROVIDED

- Forward kinematics
- Inverse kinematics
- Jacobian and Forward Velocity Kinematics
- Inverse Velocity Kinematics
- Motion Control and Trajectory Design (task mode, joint mode)

FEATURES

- Research-grade 4 DOF serial manipulator with two-finger gripper
- Compact, light-weight, stand-alone robot arm, safe to work with
- Joint angle, motor current and torque measurements for each joint
- Pre-designed controllers for simulated and actual robotic manipulator included
- Extensive course resources with independent exercises for undergraduate robotics courses included
- Courseware content mapped to the most popular robotics textbooks:
 - Craig: Introduction to Robotics: Mechanics and Control
 - Spong, Vidyasagar, Hutchinson: Robot Modeling and Control
- Fully compatible with MATLAB®/Simulink®
- Fully documented system models and parameters provided for MATLAB®, Simulink®

DEVICE SPECIFICATIONS

Serial manipulator	Customized 4 DOF robot arm by Kinova
Weight	5 kg
Payload	0.75 kg (full extension) 1.25 kg (mid-range)
Arm reach	app. 60 cm
Maximum linear speed	20 cm/s
Communication rate	500 Hz

COMPLETE WORKSTATION COMPONENTS

Plant	4 DOF serial manipulator with two-finger gripper
Control design environment	Quanser QUARC® add-on for MATLAB®/Simulink®
Documentation	User Manual, Instructor and Student Workbooks
Real-time targets	Microsoft Windows®
Data acquisition device	RS-485 serial card

* Requires PC with PCI expansion slot. PC not included in the package.

About Quanser:

Quanser is the world leader in education and research for real-time control design and implementation. We specialize in outfitting engineering control laboratories to help universities captivate the brightest minds, motivate them to success and produce graduates with industry-relevant skills. Universities worldwide implement Quanser's open architecture control solutions, industry-relevant curriculum and cutting-edge work stations to teach Introductory, Intermediate or Advanced controls to students in Electrical, Mechanical, Mechatronics, Robotics, Aerospace, Civil, and various other engineering disciplines.