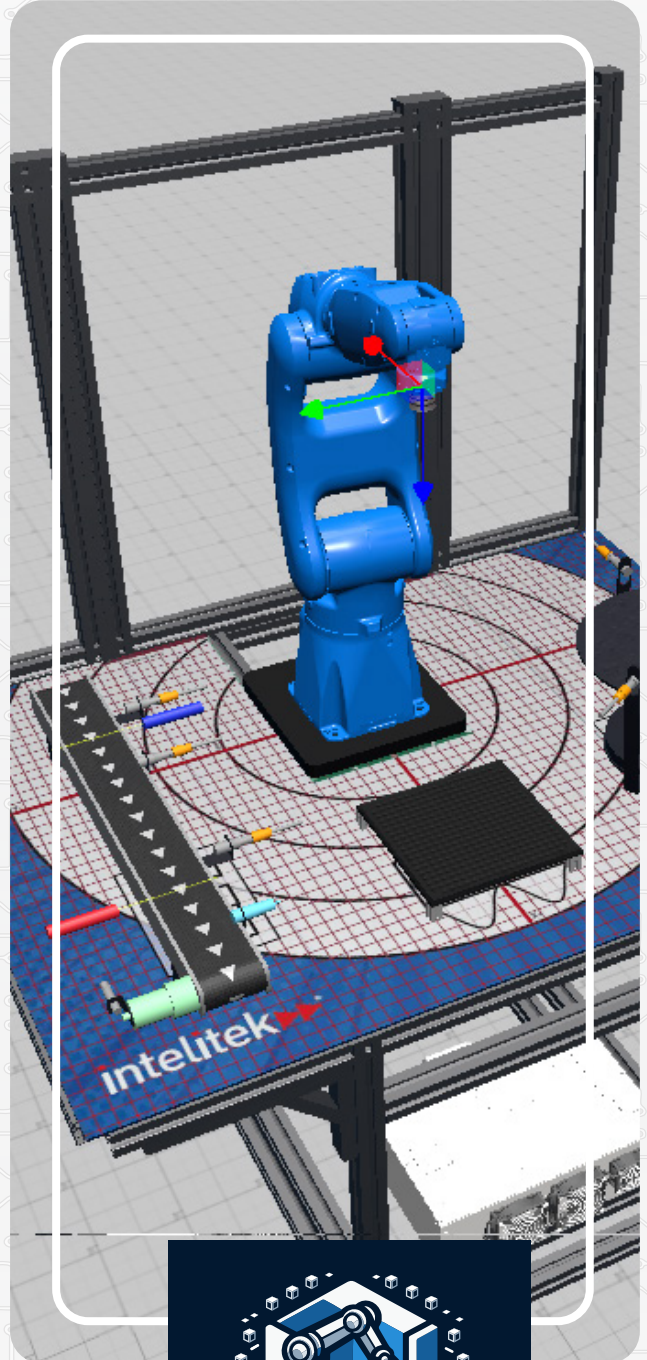# intelitek►► ®

RoboX
Virtual Industrial Robotics for CTE

RoboX is an innovative, gamified education platform for Career Tech Education in industrial robotics.

RoboX simulation and curricula enables educators and students to experience and learn how real robots operate and are programmed. The RoboX application is scalable and scaffolded for students of all levels of experience. The web-based, online environment can be accessed in the classroom, in the lab or from home.

RoboX is an advanced and intuitive platform for programming and operating robotic workcells designed to equip students with practical skills for future careers in robotics and advanced industry. The application includes realistic simulation and control of robotic arms and peripherals, providing a thorough learning experience.

RoboX can be paired in a lab with real robots or used alone to advance CTE classes to a broad audience.

Academic Representative
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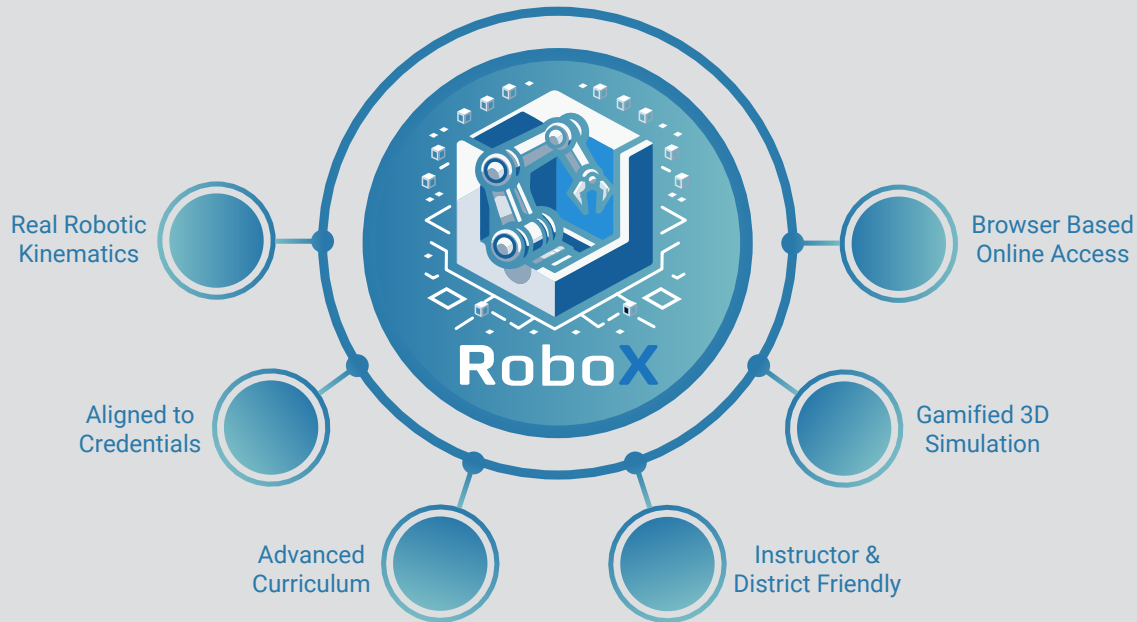### Technology Education Concepts
www.TECedu.com | 800-338-2238
info@TECedu.com

RoboX

What is RoboX?

■ RoboX is an innovative, gamified education platform for Career Tech Education in industrial robotics

■ RoboX is a learning platform with simulation, curriculum, class management, and more

■ RoboX is easy to use and fun for students with value for students, teachers, and administrators

Real Robotic Kinematics

Aligned to Credentials

Advanced Curriculum

RoboX

Browser Based Online Access

Gamified 3D Simulation

Instructor & District Friendly

Superior Pedagogic Solution

RoboX was created by educators for educators to make teaching robotics easier. It is a solution for schools and districts to plan, implement and track robotics education

Built for Teachers

Not all educators are robotics experts and RoboX is designed to help build their knowledge and competencies with an important focus on teacher resources including:

- Teacher Dashboards
- Instructional videos
- Course outlines
- Lesson plans
- Sample programs
- Professional development
- Access to student work online
- Grading and assessment tools

Made for School Admins

- District, school, instructor, and student level reporting
- IT friendly - No installation required
- Comprehensive class management including integration with rostering
- Academically aligned with assessments, quizzes, and evaluations
- Student progress tracking, heatmaps, and grade tracking for teachers and administrators
- Compliant with COPPA, FERPA privacy and IT requirements

Created with Curriculum

RoboX is integrated with student-paced or instructor led curriculum where the concepts of robotics, robot operation, and robot programming are taught. Aligned with Industrial Robotic Certifications, the curriculum elevate students to be proficient with the skills needed to work in industry

FUNDAMENTALS OF ROBOTICS WITH ROBOX

Fundamentals of Robotics curriculum features RoboX simulation and provides students with a opportunity to gain experience and skill in robotic operations and programming through the advanced robotic simulation.

This module gives students the fundamental skills needed to operate, maintain, program and test robotic systems. Students learn how to perform skills such as manipulating the robotic arm, creating basic motion programs, resolving errors, and defining coordinate systems.

ADVANCED ROBOTIC PROGRAMMING WITH ROBOX

Building on Fundamentals of Robotics, Advanced Robotics explores advanced robotic programming. Using RoboX simulation, students gain a greater understanding of robotic concepts, programming, and capabilities, including how to develop and write robot programs for manipulating objects and other automated tasks.

The progressively more complex missions challenge students to design solutions for industrial applications with emphasis on real industrial concerns and program efficiency.

ROBOT GRIPPERS

Robot Grippers explores the tools that industrial robots use to perform material handling operations. The course investigates gripper technologies, covering physical specifications and functional characteristics of devices.

Aligned with Certification framework:

Robotics Operator | Robotics Programmer

Partnering with leading certification bodies like NIMS as well as industry leading robotics suppliers like Yaskawa to deliver industry recognized certifications ensures students have portable credentials desired by industry to advance their careers.

RoboX for Education

Developing Career Exploration and Training:

❙ Designed for high school and post-secondary CTE programs to explore careers in robotics and industry

❙ Provides hands-on robotic experience with programming and simulation.

❙ Supports training for employment with industry-standard tools and techniques

❙ Opens opportunities for career advancement in Industry 4.0
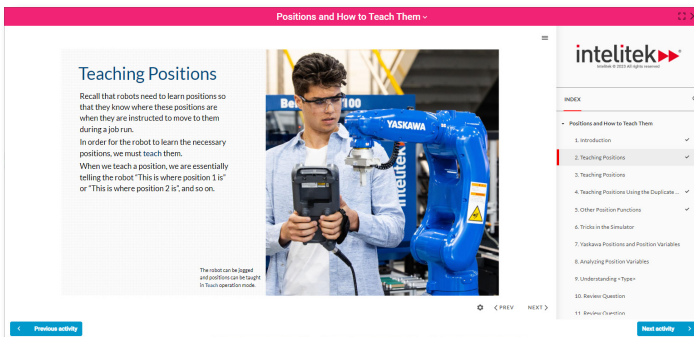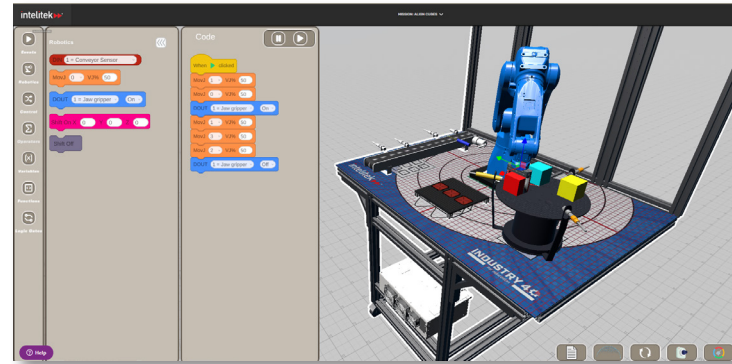
Engaging Game-Based Learning

❙ Gamified missions to make learning robotics and programming fun and interactive

❙ Realistic robot kinematics provide real-world experience

❙ Integrated with lessons, theory, evaluations and missions

Robust Teacher Support

❙ Structured missions and flexible pacing to fit classroom schedules and student experience levels

❙ Teacher dashboards for monitoring progress and performance

❙ Detailed student progress and performance reports enable targeted assistance and tailored lesson plans

❙ Access to student work online, course outlines, lesson plans, and sample program solutions

❙ Mission specific objectives automatically validated to confirm task completion

❙ Quizzes, evaluations, grading, and assessment tools to track and evaluate student performance

❙ Instructional videos and professional development resources
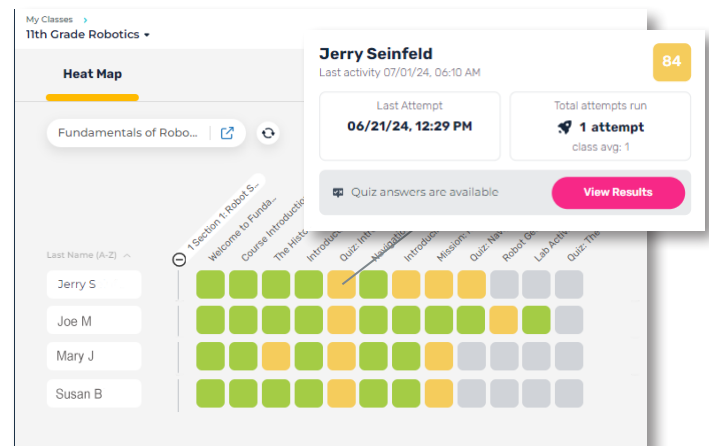
* Feature planned for 2025

State of the Art Robot Kinematic Simulation

Key Features of RoboX

Accessibility and Compatibility:

- Accessible from any device with internet access
- Compatible with Chromebooks and other devices
- No installation required
- Designed to be inclusive and accessible for all students

Dynamic 3D Simulation:

- Intuitive interface designed for novice and advanced users
- Replica of the dimensions and functions of robotic equipment
- Simulation of robot movement and gripper part manipulation
- Collision detection for safe and precise operations
- Visible robot program execution for tracking and debugging
- 3D visualization of the robot's work envelope for enhanced spatial awareness and planning
- Simulated peripheral devices like conveyors and rotary tables

Education Platform

- Curriculum integrated with labs step students through learning sequences
- Videos, tutorials, presentations, independent learning
- Integrated quizzes and assessments with progress tracking and reporting

Industrial Robot Functionality Incorporated

- Robot Control
  - Interactive graphic interface to move robot with ease
  - Manual and automated movement of robot
  - Joint or Cartesian coordinates
  - Intuitive lead-by-nose Interface
  - Speed selection
  - Shows Joints and X, Y, Z, Rx, Ry, Rz detailed position data
  - Keyboard and mouse shortcuts for easy control
- Record positions for robot arms
  - Supports both absolute and relative positioning
  - Add/Edit/Delete positions
  - Go-to-position button for quick navigation
  - Home position button for easy reset
- Intuitive Robot Programming
  - Blockly-based drag-and-drop programming
  - Program robot sequences, interaction with peripherals, and program logic
  - Run a single step, single cycle, or continuous program *
  - Execute in simulation or twinned with physical robot *
  - Real-time highlighting of command execution in the program area, providing feedback and easy debugging *
  - Tools for programming and operating robotic workcells
  - Supports Inform-II based coding blocks for advanced Yaskawa programming capabilities *
- Real-Time Data Display
  - Continuous display of robot and peripheral information (positions, encoder values and XYZ coordinates)
  - Real-time status of joint angles, encoder values

* Feature planned for 2025
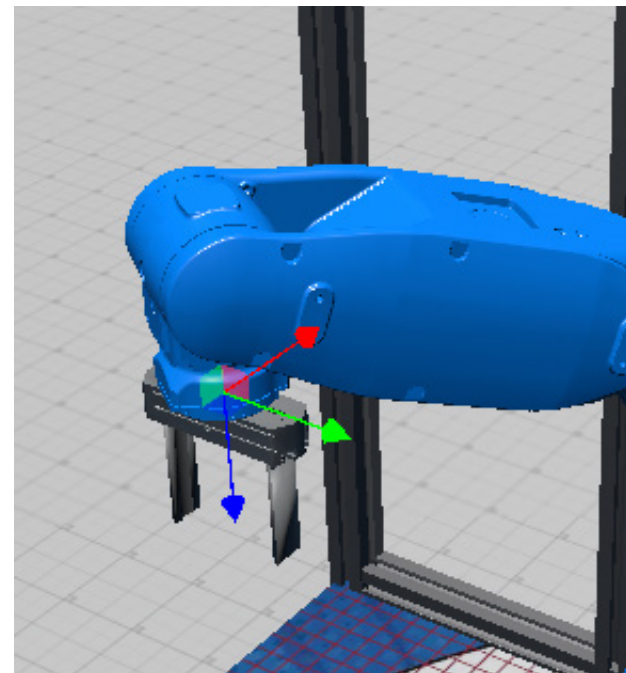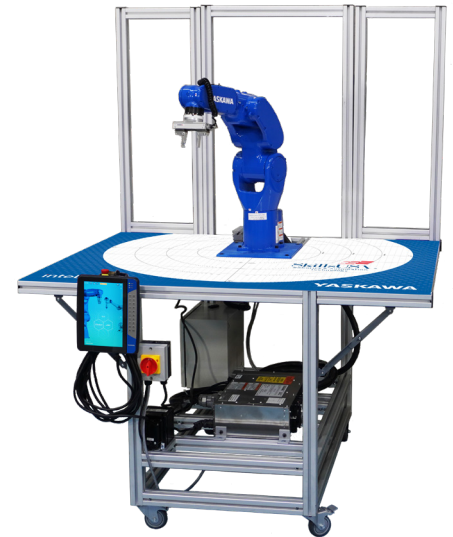
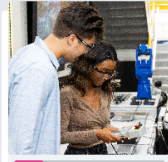## Fundamentals of Robotics - Lessons
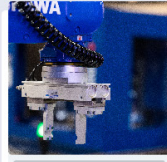
| Section 1: Robot Structure and Function	Section 2: Coordinate Systems	Section 3: Positions and Motion	Section 4: Pick-and-Place	Section 5: Interpolation	Section 6: Material Handling	Course Resources
10/12 Activities	2/6 Activities	2/10 Activities	0/6 Activities	0/4 Activities	1/6 Activities	3/4 Activities
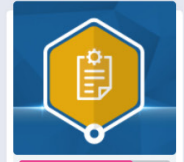
- ❯ Browser based, online, 3D simulation
- ❯ e-Learning curriculum deliver core technology training
- ❯ Self-paced or instructor-led learning, labs, and exercises
- ❯ Aligned and expandable to real hardware robots
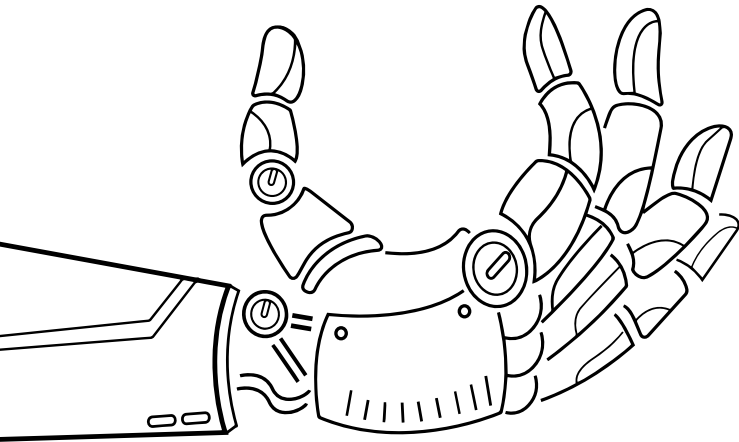
Learning Outcomes

Students will learn:

- ■ About robotics and the role of robotics
- ■ How robotics and other systems interact and are integrated
- ■ About sensors and inputs and outputs
- ■ To program and operate an industrial robot

Academic Representative

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Related Products:

❚ Hardware: Compatible with Yaskawa robotic arms and peripherals for comprehensive simulation and control

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