



## INDUSTRIAL ROBOTICS

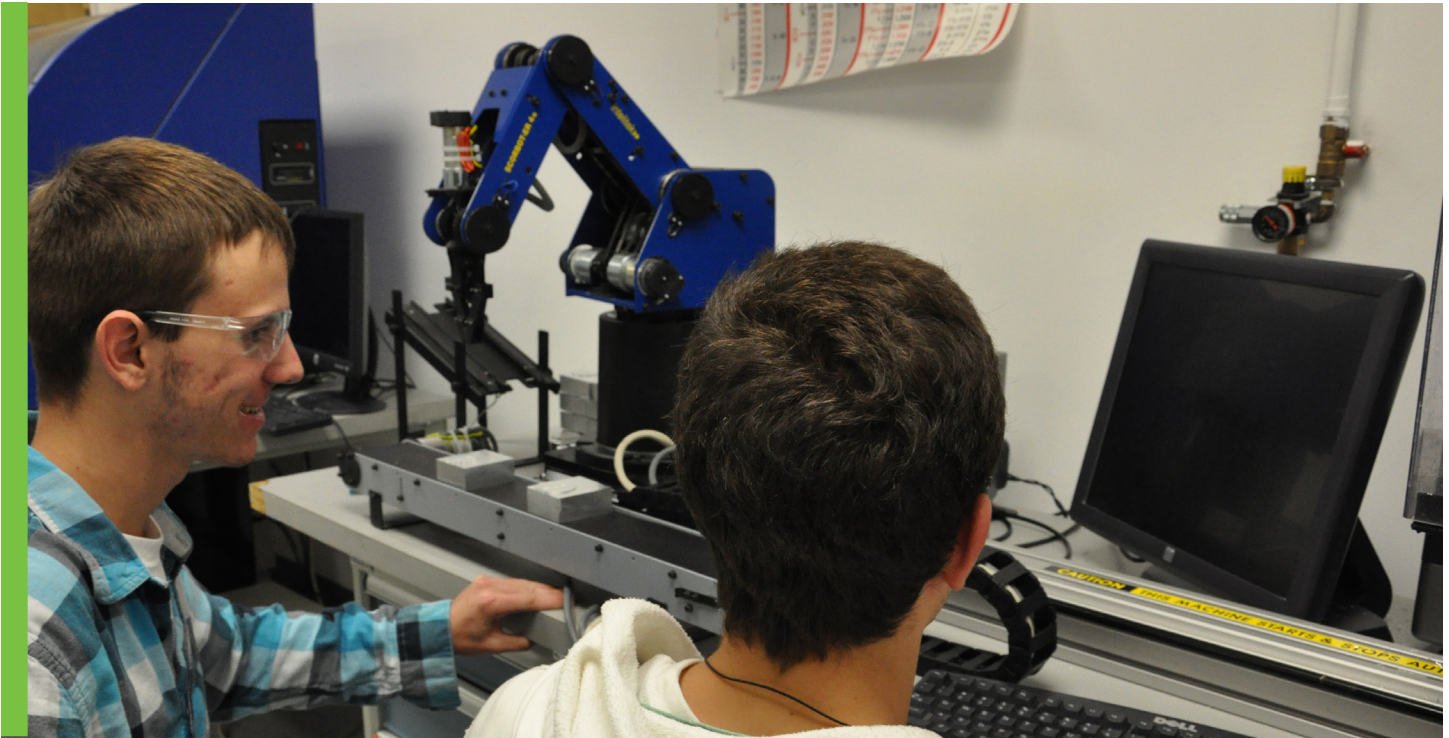
Since 1982, Intelitek’s unmatched and world-renowned ScorBot robotic training system, brings the exciting field of industrial robotics to your educational program. In partnership with Yaskawa Motoman Robotics, Intelitek delivers market leading solutions for education in robotics, manufacturing and Industry 4.0

Intelitek combines skill-based training and curriculum that include a comprehensive range of competencies, with hands-on workshops, that prepare students for jobs in modern industry.

The programs offer fundamental to advanced training using Intelitek’s blended learning approach to deliver a powerful educational experience. Combining engaging e-learning content with superior quality robotic equipment and dynamic 3D simulations prepares students for rewarding careers.

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ROBOTICS FOR INDUSTRY 4.0	CTR 4
ROBOT ARMS	CTR 6
EDUCATIONAL CARTS	CTR 8
CURRICULUM	CTR 9
ROBOTICS CERTIFICATIONS	CTR 11
ROBOTICS SOFTWARE SOLUTIONS	CTR 12



## Intelitek Pedagogic Values

Over the last few decades the face of manufacturing has changed. Globalization and automation have transformed the factory floor from an army of hardworking men and women proudly creating products with their skillful hands to an automated environment where machines do much of the work.

One of the drivers of change and a core part of Industry 4.0 is the massive progress of automated manufacturing and robotics. Robots can do many of the manual tasks faster, more accurately and safer than a human!

Intelitek career and technology training programs deliver skills-based training using advanced blended learning programs to enable educators to prepare students to integrate into in-demand professions in Industry 4.0 production and manufacturing.

Today, as work skills are learned starting in high school and through post-secondary colleges,

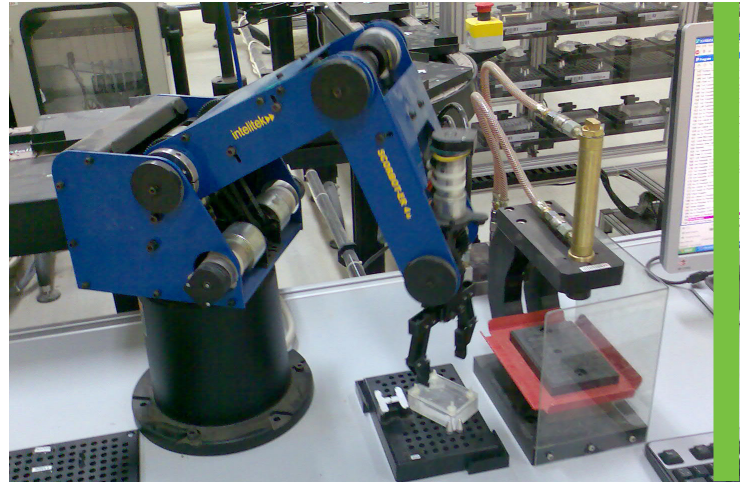
employers expect candidates to have all the experience and knowledge they need as they walk in the door.

Robotics is one of the most important programs we offer to ready students for Industry 4.0. The program delves into the use of robots, the functionality and capabilities of robots, how to integrate and use robots in industry, and how to design and program robots in your environment. More advanced programs provide use cases, practical projects, and specialized training.

The focus is not only on learning theory, but on understanding the concepts and how to benefit from robots. Programs develop critical thinking capabilities, promote self-awareness and encourage out-of-the-box thinking and innovation. Students learn soft skills like teamwork, project management, decision making, and collaboration.

## Quality Hardware

Intelitek provides exposure to industry-standard practices with hardware platforms designed for learning with industry-grade components. Intelitek educational robots partnered with Yaskawa industrial robots are the foundation of an advanced education program.



## Skill-based E-learning Content

Curriculum are skill-based, developed by industry experts from Fortune 1000 companies across a wide range of sectors.

The skill-based training consists of individual exercises that reproduce essential tasks performed by robotic technicians, operators, maintenance staff and process designers.

## Industry Competence

Intelitek interactive and multi-disciplinary curriculum entrench values that help secure jobs and work skills that enable students to thrive in collaborative workplaces with the can-do and problem solving attitude employers seek.



## Certification

Industry recognized certifications with industrial robots ensure students graduate with hands on experience, theoretical knowledge, programming skills **and** a certification recognized worldwide.

# Comprehensive Education Solution for Industrial Robotics

## Advanced Range of Industrial Robotics Arms

Intelitek and Yaskawa robotic arms include a broad range of small to large devices suited for different industrial applications and the needs of any training program.

All robots and controllers can be flexibly integrated with peripherals and into larger training systems



## Education Ready Training Platforms

Preconfigured robotics carts enable easy classroom setup and reliability. Training carts offer opportunity to train beginners and enable advanced users to learn integration.

With student safety the primary concern, these solutions include multiple safety features for classroom use.

## Simulation for Scalability

Robotic simulation s/w and h/w scale training to more students who can learn on life like systems before graduating to real hardware. Programs developed in simulation can be tested later n real hardware.

## Training and Certification for Students and Instructors

Intelitek and Yaskawa curriculum, training and train the trainer programs guide educators and students through comprehensive learning paths and culminate with certification recognized by industry manufacturers worldwide.



# Comprehensive Education Solution for Industrial Robotics

**ROBOTIC PROGRAMMING AND SIMULATION**

**INDUSTRIAL ROBOTIC ARM KITS**

**EDUCATIONAL CARTS FOR CLASSROOMS**

**INDUSTRY 4.0 WITH ROBOTICS**

**CERTIFICATION FOR STUDENTS AND INSTRUCTORS**

## WHAT STUDENTS LEARN

- Advanced manufacturing concepts and skills
- Capabilities, operation and configuration of industrial robots
- Programming and program optimization of robotic activities
- Programming techniques, languages, and smart learning
- Hands-on robotics through curriculum, projects and exercises
- Manufacturing, mechatronics, quality control and inspection
- The connection between Industry 4.0 and robotic automation
- Integration of robotics with manufacturing processes
- Integration and data exchange with ERP and MES applications

## OUTCOMES

- Accelerated student skills and capabilities
- Encourages active inquiry and higher-level thinking
- Software and hardware familiarity
- High graduation employment rates
- Piqued interest in manufacturing career paths



## CAREER OPPORTUNITIES

- Maintenance Technician
- Robotics Operator or Programmer
- Mechatronics Engineer
- Industry 4.0 Systems Integrator

## ScorBot ER-4U Educational Robot



The ScorBot ER-4U robot is a versatile and reliable 5-axis robotic arm system for educational use. The ScorBot ER-4U robot arm can be mounted on a tabletop, pedestal, or linear slidebase.

The robot's speed and repeatability make it highly suited for both stand-alone operations and integrated use in automated workcell and FMS applications such as robotic welding, machine vision and CNC machine tending. Together with ScorBase control software and RoboCell 3D simulation software, the system lets students design and control industrial workcells.

The ER4U pairs with the Intelitek USB Controller and Teach Pendant.

### STANDARD FEATURES

- 5 Axis Vertically Articulated Mechanical arm
- Controller with USB communication
- Floor-, wall- or ceiling-mounted options
- 0.18 mm (0.007") repeatability
- 1 kg (2.2 lbs) payload

## MotoMan GP8 Industrial Robot

The MotoMan GP8 is a 6-axis compact, high-speed robot. This advanced material handling robot offers high speeds, an 8 kg (17.64 lbs) payload, and 727 mm (28.62") reach. This robot is designed to provide easy set-up, operation, and maintenance with only a single cable needed to connect the manipulator and controller.

The GP8 offers superior performance in part applications such as assembly, dispensing, packaging, material handling, and machine tending. The robot supports both stand-alone applications as well as sophisticated automated workcells.

The GP8 is paired with the advanced Yaskawa YRC1000micro controller and a standard or smart programming pendant.

### STANDARD FEATURES

- Compact, high speed, powerful and economical.
- 8 kg / 17.6 lb payloads
- Impressive reach and horizontal reach enables robot to operate in wider work areas.
- Environmentally friendly - IP67 standard protection class
- Floor-, wall- or ceiling-mounted options.
- Internally routed cables and hoses maximize system reliability.



## MotoMan MotoMini Industrial Robot



The MotoMini robot is the smallest and lightest 6-axis robot in the industry. The 7-kg (15.5 lb) robot is easy to carry, ship and install.

Equipped with the highest acceleration in a small-sized robot the MotoMini is faster than comparable small robots, reducing cycle time and boosting productivity.

Internal cabling and air lines minimize interference with other process equipment, and a variety of mounting options (surface, wall ceiling, etc.) accommodate high-density factory layouts. Designed for extremely agile high-speed performance for a wide range of applications, the quiet, compact, and precise MotoMini can take small-part processes to the next level.

The MotoMini is paired with the advanced Yaskawa YRC1000micro controller and a standard or smart programming pendant.

### STANDARD FEATURES

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## MotoMan HC10DT Human Collaborative Robot

Designed for a wide selection of applications, the 6-axis HC10DT human-collaborative robot is simple, safe and easy to program robotic arm with a payload of up to 10 kg (22 lbs).

Operator's safety is assured by a Power and Force Limit technology that stops the robot in case of contact with an operator. The robot arm can be hand guided by an operator and robot positions and gripper operation can be registered via the "Easy Teaching Switch Box". These features offer time saving during the robot programming. In addition, robot programming is available through the easy-to-use touchscreen Smart Pendant with built-in Smart Frame technology,

The HC10DT is paired with the advanced Yaskawa YRC1000micro controller and a standard or smart programming pendant.

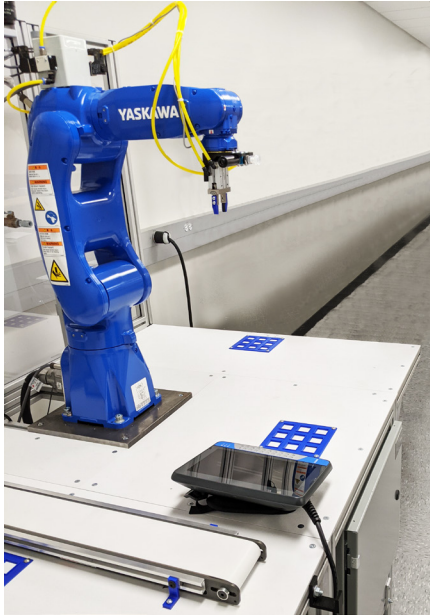
### STANDARD FEATURES

- Collaborative robot enables humans to safely work with robots
  - Power and force limiting technology protects the operator
  - Arm geometry designed to avoid pinch points (finger protection)
- No safety fence - depending on the application. Offers reduced cost and space requirements
- 10 kg (22 lb) payload with 1200 mm (47.3") reach
- Simple and easy to program with easy teaching
- Move the robot arm directly via hand guiding function: easy teaching mode with a switch box



# MotoMan GP8 Fenceless Mobile Training Cart

- Safe working/learning environment
  - Fenceless cart designs allows viewing and easy access
  - Area scanner deployed in fenceless design provides safe zone
- Compact, mobile to fit through lab doors
- Everything you need is included and on the cart.
- Multi function grippers
- Durable work surface with precision markings for exercises
- Fold out surfaces for more working area and compact storage.
- Solid extruded aluminium construction with castors
- Easy set-up - Only one cable required



The MotoMan GP8 fenceless cart for education is a big solution for small spaces. Custom designed for classroom use the mobile cart includes all the components to set up an industrial robotic classroom workstation and can be packed, moved and stored easily when not in use.

The fenceless design and speed limiting of the robotic arm ensure a safe working environment for students to learn in. The platform and accessories provide a framework for learning that is simple, easy to use and packed with features and functionality for every robotics class.

Using the GP8, 6-axis robotic arm with an 8 kg (17.64 lbs) payload and 727 mm (28.62") reach. students can program and learn a variety of robotic functions.

The GP8 is paired with the advanced YRC1000micro controller, a compact size controller with functions & performance optimized for transfer and assembly applications. The system can be paired with a standard programming pendant or the Yaskawa Smart Pendant. The cart package includes software, educational resources and training from Yaskawa..

## Standard Programming Pendant

Display: 5.7-inch color LCD touch panel 640 x 480 px  
 Dimensions: 152 (W) x 299 (H) x 53 (D) mm  
 6.0" (W) x 11.8" (H) x 2.1" (D)  
 Weight: 0.73 kg / 1.61 lbs  
 IEC Protection Class: IP54



## YRC1000micro Controller

Dimensions: 425 (W) x 125 (H) x 280 (D) mm  
 16.7" (W) x 4.9" (H) x 11.0" (D)  
 Weight: 10.5kg / 23.2 lbs

Digital I/Os: Specialized signals: 7 inputs and 1 output  
 General signals: 8 inputs and 8 outputs  
 (8 transistor outputs)

Programming Capacity: JOB: 200,000 steps, 10,000 instructions, CIO ladder: 1,500 steps max.

Power: Single-phase 200/230 VAC

Safety: Integrate FSU (Functional Safety Unit) for position monitoring (32 zones), speed limiting, tool monitoring, graphic pendant setup.

## Smart Programming Pendant

Display: Capacitive touchscreen smart device  
 10.1" WXGA TFT Display  
 1280 x 800 pixels  
 LED back light touch panel  
 Dimensions: 215 (W) x 283 (H) x 68.5 (D) mm  
 8.5" (W) x 11.1" (H) x 2.7" (D)

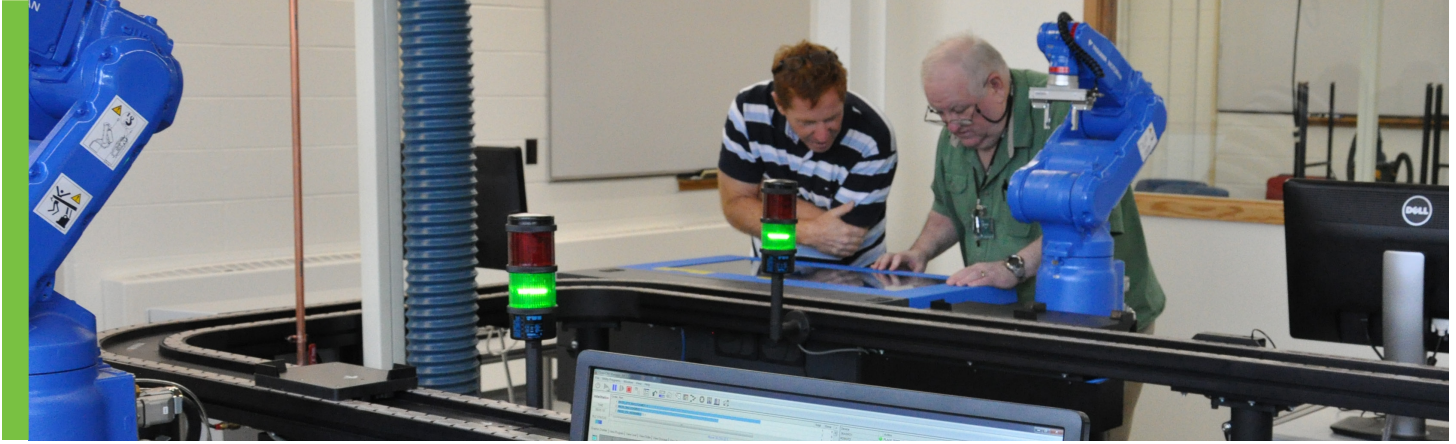
Weight: 1.12 kg / 2.5 lbs

CTR 8





# Robotics Curriculum



## Fundamentals of Robotics

The Fundamentals of Robotics courses provide students the skills needed to operate, maintain, program, and test robotic systems. The curriculum uses RoboCell, a 3D-solid modeling robotic simulation software, which allows students to develop programming skills through a variety of simulated robotic workcells.

Students will learn the core components and operating principles of robots and then develop programs that will drive the robots. Programming sections include advanced topics like variables, inputs/outputs, sensors, optimization, debugging, and will implement projects to evaluate their understanding of the skills.

Prerequisite course for Yaskawa Operator Certification



### SKILLS LEARNED

- Introduction to Robotics
- How Robots Work
- Using Robotic Control Software
- Recording Robot Positions
- Programming a Simple Pick and Place Task
- Absolute and Relative Positions
- Basic Robotic Programming Tools
- Block Alignment Project
- Feeders and Templates
- Peripheral Devices
- Linear Slidebase Project
- Encoders
- Roll and Pitch
- Programming the Robot to Execute Linear and Circular Movements
- Final Project: Drawing a House

## Advanced Robotics

Building on the Fundamentals of Robotics curriculum, Advanced Robotics courses explore advanced robotic programming.

In Advanced Robotics Programming, students will use RoboCell to teach positions, write programs, debug robotic applications, and test their execution offline using a virtual robot.

Prerequisite course for Yaskawa Programmer Certification



### SKILLS LEARNED

- Review of Robotic Fundamentals
- Programming with Subroutines
- Digital Inputs
- Digital Outputs
- Project #1 - Delivering Materials with a Conveyor
- Conditional Branching
- Project #2 - Programming with Conditional Branching
- Analog Inputs and Outputs
- Loops and Counters
- Contact and Non-Contact Sensors
- Programming a Sorting System Project

## Robotics & Materials Handling

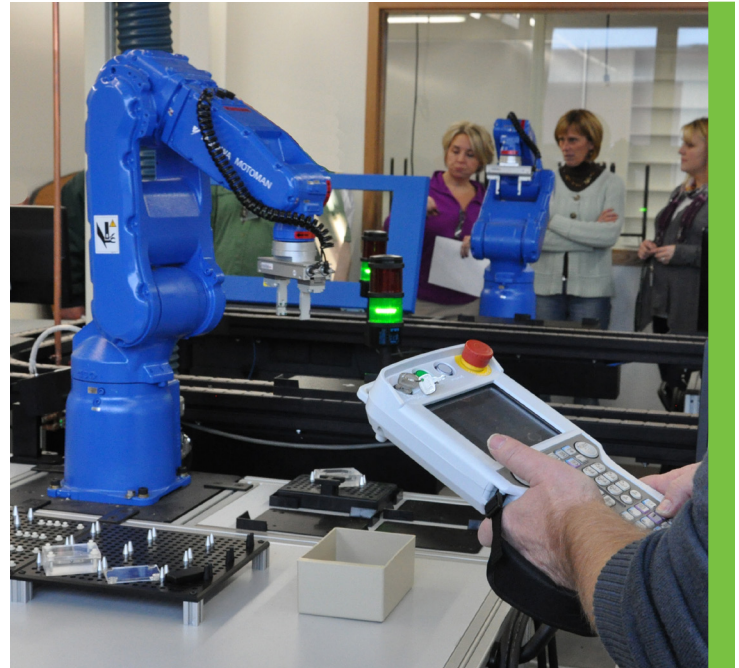
In Robotics and Materials Handling students work with the simulation and programming software to develop and write robot programs for manipulating objects and other automated tasks.

The activities challenge students to design solutions for industrial robotic applications, with emphasis on real industrial concerns, such as recording accurate positions, optimizing programming and increasing productivity.

In part 2, students work with RoboCell and other 3D-solid modeling robotic simulation software, to program and operate the robot.

### SKILLS LEARNED

- Robotic Control Software
- Recording Robot Positions
- Writing and Running a Robot Program
- Cartesian Coordinates
- Inputs and Program Jumps
- Outputs
- Joint and XYZ Coordinate Systems
- Relative Positions
- Loops, Polling, and Counters
- Subroutines
- Contact and Non-Contact Sensors
- Servo Control of the Conveyor
- I/O Control of the Conveyor
- Manipulating Blocks (Project)
- Programming the Robot to Execute Circular Movements
- Roll and Pitch
- Block Alignment (Project)
- Feeders and Templates
- Peripheral Devices
- Linear Slidebase (Project)
- Programming Using Encoder Values
- Conditional Branching
- Analog Inputs and Outputs
- Programming a Sorting System (Project)



## Train the Trainer

The Train-the-Trainer Program is designed specifically for educators to support educational institutions who provide students with Yaskawa industrial robotic credentials. The rigorous program provides training, resources and tools for instructors to teach a robotics credentialing course. Train-the-Trainer consists of multiple phases. Participants will learn to deliver Yaskawa's robotics curriculum in a knowledgeable, confident and consistent manner. Length of training varies depending on the participant's robot programming experience. Educational institutions with credentialed trainers can deliver Yaskawa training independently.

Phase I – Pre-work and assessment using Yaskawa Academy's web-based curriculum.

Phase II – Participants attend the training class as a student. The focus of this phase is to learn and understand the topics as delivered from a Yaskawa Academy certified instructor.

Phase III – Teacher workshop environment focusing on teaching skills for the school instructor. This workshop will enable the instructor to become more familiar with the topics prior to developing and/or delivering curriculum at their own facility.

Once completed, schools and educational organizations can deliver training and add the Yaskawa Academy logo to their certificate of completion.

## YASKAWA CREDENTIALING AND CERTIFICATION

Intelitek career and technology training programs are designed to assist high schools, community colleges, technical schools and universities to offer industry-recognized robotics training based on the Yaskawa MotoMan robotic arms and controllers. Certification is centered around instructors. Intelitek and Yaskawa provide advanced train-the-trainer programs to enable qualified instructors who are then able to educate students and deliver Certifications.

The robotic training program for students delivers skills-based training using advanced, blended learning programs to prepare students for in-demand professions in production and manufacturing.

Supported by Yaskawa, the leading manufacturer of industrial robots, the robotic certifications provide students with career credentials that can be applied toward the use of all Yaskawa robots used in industry as well as other industrial robots.

### CERTIFIED YASKAWA ROBOT OPERATOR:

Requires students to complete and pass the tests for the Fundamentals of Robotics for MotoMan FS100 or YRC1000 controller.

### CERTIFIED YASKAWA ROBOT PROGRAMMER:

Requires students to complete and pass the tests for both the Fundamentals of Robotics and the Advanced Robotic Programming for MotoMan FS100 or YRC1000 Controllers

Graduates of the Intelitek/Yaskawa training can be certified as a MotoMan Operator or Programmer by taking a practical exam and final certification test with a certified instructor.

### BENEFITS OF ROBOTIC CERTIFICATION:

**Deliver Workforce-Ready Graduates** – students leave experienced with multiple facets of robotics and automation. Graduates enter the workforce ready to operate any industrial Yaskawa robot.



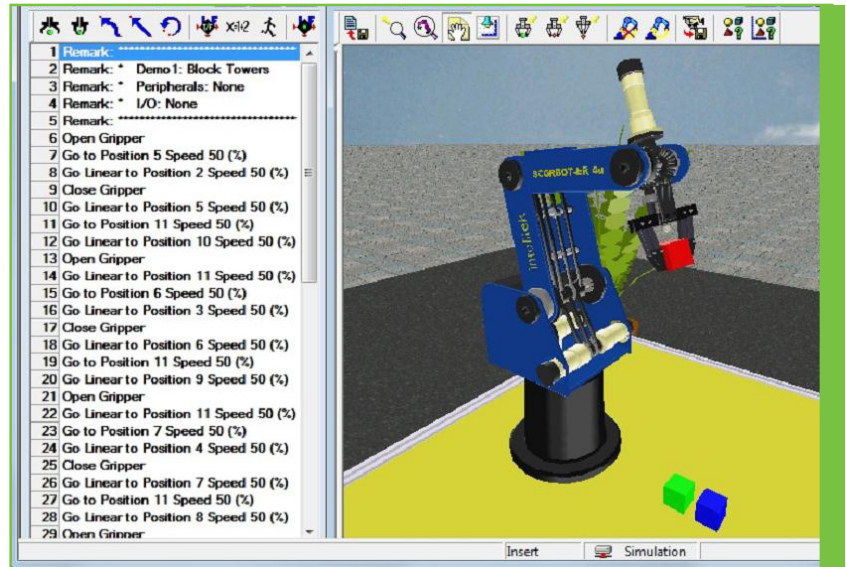
# Simulation & Programming Software

## ScorBase

ScorBase robotics control and simulation software provides a comprehensive and intuitive tool for programming and operating robotic workcells. The software allows students to experiment with a variety of simulated workcells as part of the Intelitek curriculum or independently.

The software has several operational levels, each with progressively more functionality, making the software suitable for both novice and advanced users.

The software supports peripheral servo axes and both digital and analog I/Os, thereby providing a comprehensive tool for programming and operating an entire robotic workcell.



### FEATURES:

- Intuitive user interface designed for training environments
- 3 operating modes: Online, Offline and Simulation
- Several operational levels, each with progressively more programming and operational features, allow novice and advanced users to work in environments best suited to their level of expertise.
- Manual control of robot and peripheral axes
- Position recording
- Real-time data display
- Manipulation of 160 user-accessible parameters
- Learning optimized program editing interface
- Program execution both online and offline
- Open system: integration and support for workcell components like ViewFlex Machine Vi-sion, MIG Welding System and more.
- English, Spanish, Portuguese, German, Korean, Vietnamese, Polish Interface languages
- Comprehensive online help
- Demo projects

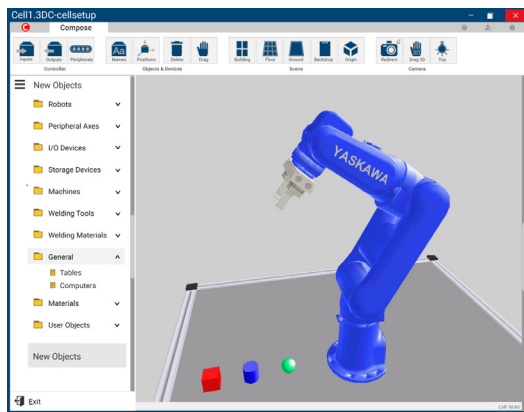
## RoboCell

RoboCell integrates ScorBase's robotic control software with interactive 3D solid modeling simulation software. RoboCell's virtual robots and devices accurately replicate the actual dimensions and functions of Intelitek Robotic equipment. Students can teach positions, write programs and debug robotic applications offline before executing them in an actual workcell.

RoboCell allows students to experiment with a variety of simulated workcells, even if the actual workcells do not exist in the lab. Advanced students can even design 3D objects and import them into RoboCell for use in virtual workcells.

### FEATURES:

- Robotic workcell setup
- Simple point and click creation of virtual robotic workcells
- Peripheral axes, connection of sensors and I/O devices, storage devices and feeders
- Programming and control of robotic workcells
- English, Spanish, Portuguese, German, Korean, Vietnamese, and Polish Interface languages
- Dynamic 3D simulation
  - Robot movements and gripper part manipulation.
  - Peripheral axes: conveyor belts, XY tables, rotary tables, linear slidebases
  - CNC mills and lathes
  - Automated welding system
  - Parts and sensors
  - Detection and response to impact conditions and axis limits
- Robocell can run ScorBase programs in 3 modes:
  - Online: Enables you to control the robotic cell
  - Simulation: Virtual robotic cell simulation in the 3D display
  - Offline: Enables debugging of ScorBase programs

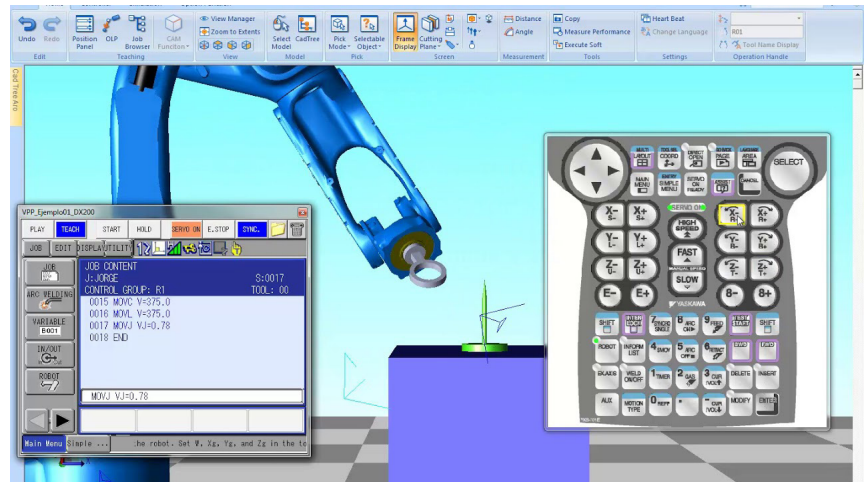


## MotoSIM Virtual Robot Simulation and Control

MotoSim® EG-VRC (MotoMan Simulator Enhanced Graphics – Virtual Robot Control) is a comprehensive software package that provides accurate 3D simulation of Yaskawa robot cells for offline design, programming, testing and learning.

This powerful simulation software can be used to learn robot programming and operation and to optimize robot and equipment placement, perform collision detection, reach modeling and cycle calculations. It also provides accurate off-line programming of complex systems.

The MotoSIM EG-VRC simulation software operates like a real environment and displays the actual programming pendant interface for the controllers.



### FEATURES

- Designed specifically for K-16 schools and training organizations, MotoSIM provides “real” robot experience while programming off-line on a PC
- Simulates a fully functional production environment while learning in a safe, virtual environment
- Setup in the classroom or robotics lab is quick and easy to learn robotic operation and programming with no hardware
- Programs created in MotoSim can be downloaded to the robot controller or shared
- Supports multi-robot and multi-controller simulation

## MotoSIM Touch Virtual Robot Simulation and Control with Programming Pendant

MotoSIM Touch is a complementary solution to MotoSIM EG-VRC providing hands on virtual robotic training for students

MotoSIM Touch integrates a real programming pendant with the simulator software package provides a hands-on accurate 3D simulation of robot cells for offline design, programming, testing and learning of Yaskawa MotoMan Robots.

Pairing the simulation software with MotoSIM Touch allows students to toggle between a virtual pendant and a hardware pendant to experience a fully functional production environment.

MotoSIM Touch simulates the FS 100 and YRC1000 Micro controllers and works with the standard pendant and smart pendant.

### FEATURES

- Designed specifically for K-16 schools and training organizations, MotoSIM Touch simulates a fully functional production environment.
- Setup is quick and easy, with only four cables to plug in.
- Provides “real world” virtual robotics experience at a fraction of the cost of an industrial robot
- Provides hands-on, STEM-aligned environment for robotic modeling and programming
- Teaches industry-recognized career ready robotics skills



### BENEFITS OF MOTOSIM

- Large class access to robot training
- Virtual learning in safe environment
- Multi-user access to robot exercises with limited hardware.
- Assessment environment for robotic training

## Intelitek Learning Solutions

Intelitek transforms education across the globe with comprehensive technology learning solutions. Our innovative tools and technologies empower instructors and inspire students to improve the world around them. We understand the changing needs of your career and technology classrooms and design flexible solutions that meet those needs.

With sustainable support and professional development to ensure the continued success of your programs, Intelitek programs deliver the competencies needed for in-demand careers.

At Intelitek we are producing results for students, teachers, nations and economies.



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