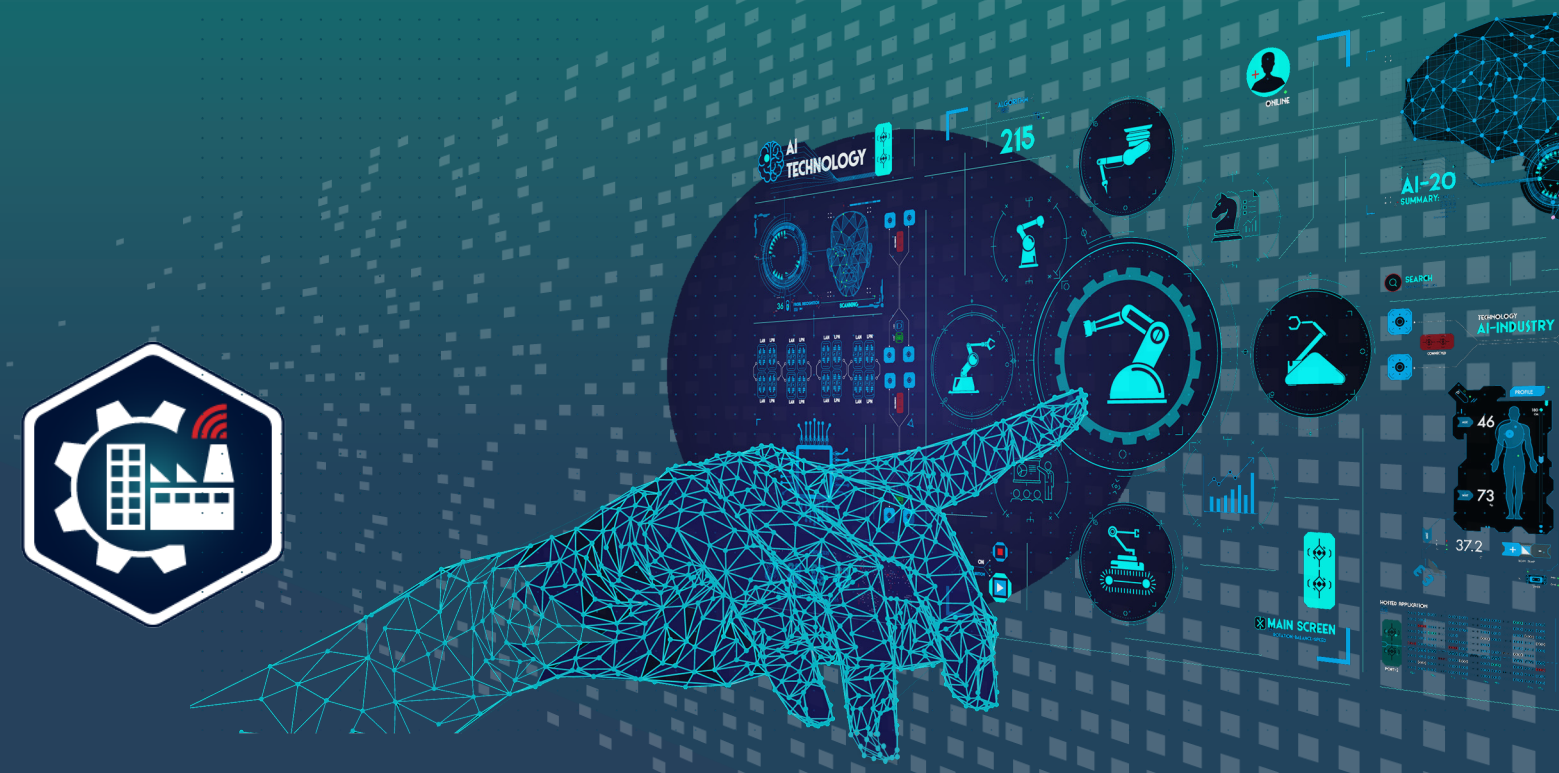
intelitek

INDUSTRY 4.0

SmartCart 4.0



Industry 4.0 Robotics and Automation for Education

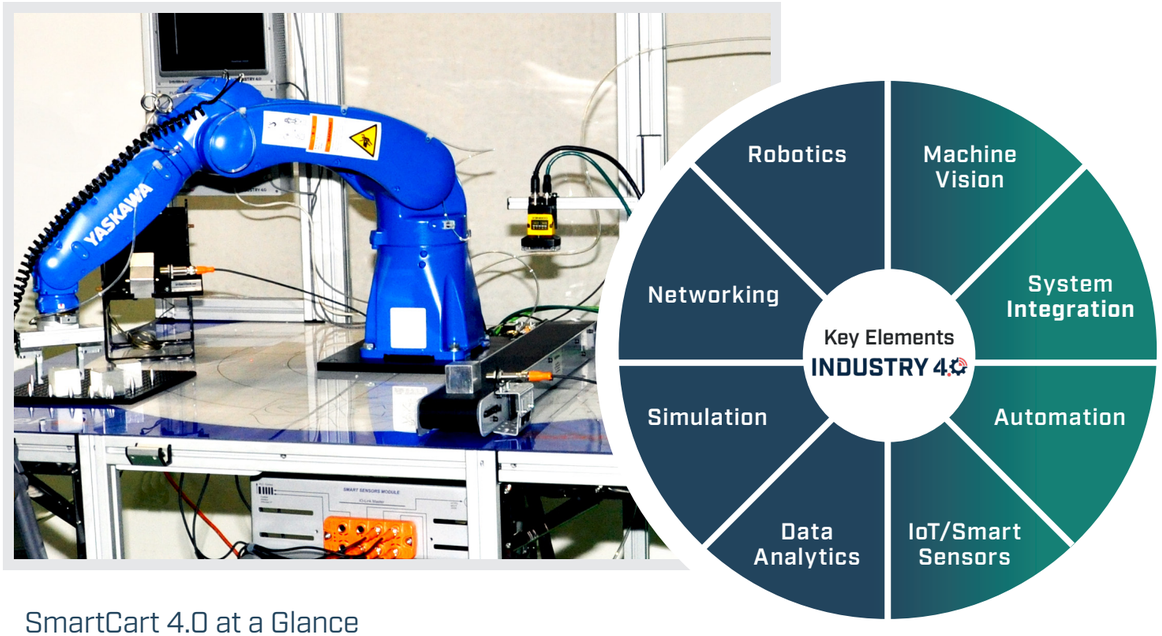
The SmartCart 4.0 is an education platform designed to enable CTE classrooms to teach the industrial automation and industry applications needed in modern workplaces and to create skilled workers for next generation jobs. Taking an approach focused on system integration and industrial robotics for Industry 4.0 ecosystems, the SmartCart 4.0 is an all-inclusive training platform for advanced students. SmartCart 4.0 offers industrial training for robotics, PLCs, machine vision, smart sensors, IoT, system control, integration, and the essential employability skills students need in modern industry.

Aligned with NIMS®

CYBERSECURITY | AI | AUTOMATION | CLOUD COMPUTING | ROBOTICS | IoT | BIG DATA

Reshaping Manufacturing Training

As Industry 4.0 becomes more widely adopted new career options will be created in industry that do not currently exist.



SmartCart 4.0 at a Glance

- Fully integrated Industry 4.0 Education Solution
- Robotics, Smart Sensors, PLC, Machine Vision, IoT, Networking, Integration, Automation, and more
- Training environment leading to certification
- Advanced industrial robotics platform with industry 4.0 curriculum, functionality, and lab exercises
- Extensive curriculum from basic to advanced level
- Hands-on, job-ready skills training for in-demand career paths in industry

Industry 4.0 is centered around the integration of systems and on sharing and using data to modernize manufacturing and keep businesses competitive in our fast-changing world. To keep up with the rapid changes in industry adopting new Industry 4.0 technologies, training programs and certifications for skilled employees need to focus on multi-discipline systems.

Employers need workers who are technically advanced, process savvy, and natural problem solvers to take a role in the ongoing installation, troubleshooting, and improvement of industry 4.0 manufacturing systems.

The SmartCART 4.0 is an industrial robotics training system packed with Industry 4.0 technology to educate students not only on how these components work but how they work together.

With the focus on advanced manufacturing technologies and how they are integrated to deliver automated systems, the platform is an ideal environment to delve into Industry 4.0 skills like advanced communication, Internet of Things, data analytics, and automation. Built around an industrial robot, the system integrates multiple smart sensors, a programmable logic controller, Human Machine Interface, and other accessories to teach students the complexities of how these systems interact in real industrial processes.

SmartCart 4.0

SmartCart 4.0

SmartCart 4.0 is a modular and flexible solution for educating and training students in the principles and technologies of Industry 4.0 integrated manufacturing.

WHAT YOU WILL LEARN

SmartCart 4.0 introduces students to the concepts of Smart Factory Automation, communications, and the use of Smart sensors on equipment to acquire and process real-time data to optimize processes. Students will acquire and apply knowledge of Automation, PLC's, Robotics, Smart Sensors, and Machine Vision to create and operate an integrated robotic system.

CURRICULUM

- Intro to Industry 4.0
- Advanced Industry 4.0 Concepts
- Fundamentals of Industrial Robotics
- Advanced Industrial Robotics
- Robotic Grippers
- Machine Vision and Quality Control
- Programmable Logic Controllers (PLCs)
- Intro to IoT and Communications for Industry 4.0
- NEW! Industry 4.0 Robotics and Automation

LEARNING OUTCOMES

- An understanding of Industry 4.0 and it's relevance and application in industry
- Knowledge of PLC's, Robotics, Smart Sensors and Machine Vision systems and how to integrate these systems
- Industrial credentials for Robotics, Machine Vision, PLC programming and Industry 4.0

SmartCart 4.0 for Industry 4.0 Education Programs

1 CROSS FUNCTIONAL TRAINING

The SmartCart 4.0 incorporates multiple technologies related to robotics, automation, integration and Industry 4.0 bringing a training platform that can used for instruction of a broad set of topics including

- Robotics
- Materials Handling
- PLCs and HMI Automation
- Smart Sensors
- Machine Vision
- Industry 4.0

2 CERTIFICATION

Aligning educational oputcomes with industry certification ensures programs can meet funding requirements and students graduate with independent validation of the skills they have learned.

The SmartCart 4.0 curriculum and lab exercises align to:

- Yaskawa Robot Operator
- Yaskawa Robot Programmer
- Cognex Machine Vision Operator
- NIMS Industry 4.0 Smart Certification for Production Specialist

3 HANDS-ON WORKSHOP WITH CURRICULUM

- Curriculum for Robotics, Machine Vision, PLC, Smart Sensors and Industry 4.0
- Hands-on labs for Robotics, Machine Vision, PLC, Smart Sensors and Industry 4.0.
- New curriculum and labs - Robotics, Automation and Integration for Industry 4.0
- Project-Based Learning (PBL) capstone environment supports multiple student challenges

4 ALL INCLUSIVE BUNDLE

Plug and play fully integrated industry 4.0 capstone project includes all the hardware, software and curriculum for teaching all the skills and competencies of Industry 4.0.

The platform can be used for multiple projects that students will design and operate themselves

SmartCart 4.0 - Capstone Project

- Custom designed for Industry 4.0 needs
- Modular and expandable platform for PBL
- Platform can be customized and configured
- Integrate technologies
- Practice data collection, design and buiild and smart decision making applications

5 INDUSTRY 4.0

The SmartCart 4.0 includes capabilities and technologies that elevate the training from skills training to Industry 4.0 training and takes learners to the next level of advanced manufacturing

- Networking and IoT
- Smart Sensors with IO-Link
- PLC programming with HMI control
- Data collection and analysis
- System integration

All this leads to project where data and software can be used to teach industry 4.0 concepts like:

- System optimization
- Predictive maintenance
- Operation efficiency

6 FOCUS ON INTEGRATION

The platform focuses specifically on the integration of PLCs, robotics, smart sensors and machine vision. Students will connect, operate, and control safety devices, learn intradevice communications and program interaction between systems on the cart..

7 SENSORS AND IOT

A series of advanced smart sensors and machine vision sensors are used for monitoring, tracking, quality control and maintenance of the many devices on the cart The sensors connect to the systems control functions and provide a flexible learning environment for students.

8 ADVANCED INDUSTRIAL ROBOTICS

The core of advanced manufacturing for Industry 4.0 is the use of industrial robotics and the SmartCart 4.0 is built around the Yaskawa Industrial robot. Integrating the robot with sensors, actuators, control elements and accessories builds a muti-dimensional training solution for education..

Curriculum
Robotics, Automation, and Integration for Industry 4.0

This capstone course is focused on the integration of the components included with the SmartCart 4.0. Following the core courseware, this course will introduce students to the concepts of intercommunications between systems and teach them about data collection, integration, autonomous decision making and Industry 4.0 value creation.

The SmartCart 4.0 system will introduce students to the concepts of Smart Factory automation, communications and the use of smart sensors to acquire and process real-time data to optimize processes. Students will acquire and apply knowledge of Automation, PLC's, Robotics, Smart Sensors, and Machine Vision to create and operate an integrated robotic system.

COURSE OUTLINE

Section 1: Getting Started
- Defining Industry 4.0/Advanced concepts and benefits
- System components
- Meet your SmartCart 4.0
- SmartCart 4.0 functionality

Section 2: Robotics
- Pre-requisite Course: Fundamentals of Robotics
- Role of robotics in Industry 4.0: The Smart Factory (automotive, medical, logistics, etc.)
- Robotic integration & communications
- Optional Exercise: Yaskawa Robot Operator Certification
- Pre-requisite Course: Advanced Robotics*
- Pre-requisite Course: Robot Grippers
- Optional Exercise: Yaskawa Robot Programmer Certification
- Pre-requisite Course: Robotics & Material Handling
- Integrating the robot with other equipment (controller communications)
- Lab: Robotic communications and the integration of sensors
- Lab: Develop and write programs to task the robot to manipulate objects

Section 3: PLCs
- Pre-requisite Course: PLC Programming 1, 2, 3,& 4 for Allen-Bradley or PLC Programming 1 & 2 for Siemens (additional hardware required)
- Role of PLC's in Industry 4.0: The Smart Factory
- The PLC inputs and outputs: The Smart Factory
- PLC communications (Ethernet/IP, Profinet, other)
- PLC and robotic communications
- Lab: Identify PLC components and their use
- Lab: PLC communications with other systems including robots
- Lab: Program a PLC to communicate with SmartCart 4.0 devices

Section 4: The HMI interface
- Programming the HMI
- Lab: HMI control interface (programming project)
- Lab: HMI reporting interface (programming project)

Section 5: SmartSensors - IIOT Monitoring
- Prerequisite: Smart devices for Industry 4.0
- Role of sensors in Industry 4.0
- Role of sensors in manufacturing
- IO-Link communications
- PLC communications with IO-Link Master (setup and troubleshooting)
- Lab: Integrating the PLC, robot and sensors

Section 6: Machine Vision
- Pre-requisite Course: Machine Vision & Quality Control 1 & 2
- Optional Exercise: Vision certification with Cognex
- Role of machine vision in Industry 4.0
- Interfacing the Cognex QC vision sensor with the PLC
- Interfacing the machine vision software with the cart network
- Lab: Integration the PLC, robot, sensors and machine vision

Section 7: Designing an Industry 4.0 Work Cell - Data Collection, Decision Making
- Architecture of Industry 4.0 industrial process
- Lab: Integrated work cell exercise with design, data collection, and decision making

Section 8: Final Project - Industry 4.0 Value Creation

Section 8 will include three capstone projects to summarise the course. Each project focuses on a different pillar of Industry 4.0: Logistics, Marketing, and Manufacturing.

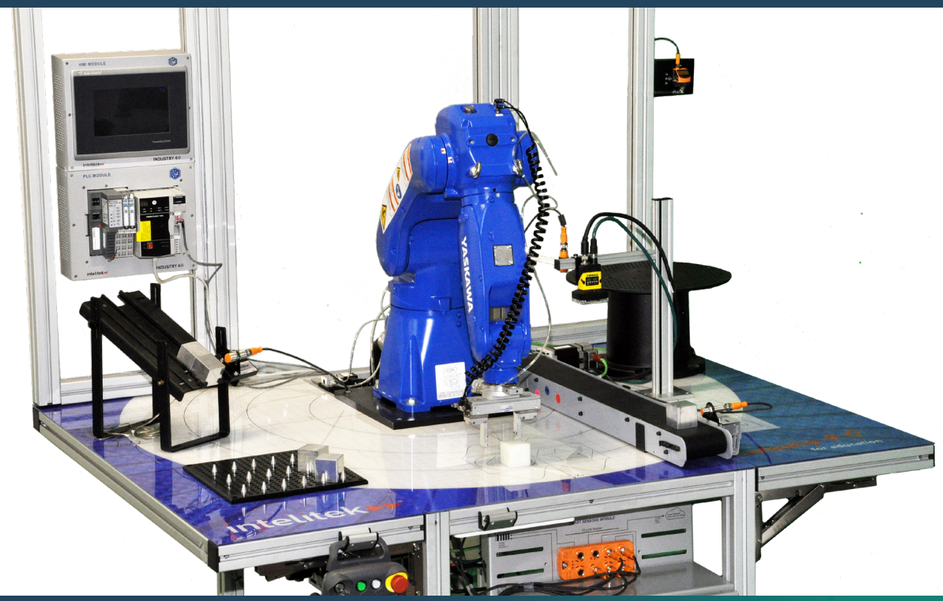
The projects make use of the concepts learned throughout the course and educate students to integrate the innovations they have learned into real applications.

For example, tasks that reflect:
- Customer-driven insight and customization - flexible mass production
- Using warehouse/inventory data to manage resources, forecast demand, and do smart warehousing
- Introduce artificially-induced changes to automate demand forecasting and to drive optimization
- Use sensor data for automation, predicative maintenance, end-to-end visibility, and remote monitoring

Complete Education Package for Robotics, Automation, Integration & Industry 4.0

ALIGNED TO INDUSTRY 4.0 CREDENTIALS FROM NIMS

Intelitek curriculum and activities are desgined to align with the National Institute for Metalworking Skills' (NIMS) Smart Smart Training Solutions (STS). Intelitek provides a NIMS approved Performance Measure for NIMS Industry 4.0 Smart Production Specialist Credentials ensuring students can complete and achieve NIMS certification for Industry 4.0



SMARTCART 4.0 FEATURES

- Mobile cart on wheels
- Accessible Fenceless design
- Allows full view and access to equipment for students
- Safety laser area scanner enforces safe working/learning zone
- Everything needed is on the cart including the robot, the controller, and industry 4.0 elements
- Dual Gripper
  - Parallel gripper and suction gripper
  - Includes laser pointer for path tracing
- Durable work surface with precision markings for exercises like:
  - Palletizing, depalletizing
  - Pick and place
  - Tool path and spline shape tracing
- Lab Accessories mount on surface for exercises
- Plug and Play for easy set-up and storage

SMARTCART 4.0 INCLUDES

- The SmartCart 4.0 is a fully loaded package with all the accessories required for the Robotics, PLC, Machine Vision, and Industry 4.0 Curriculum and lab exercises. This includes:
- Multi function end-effector with 40mm parallel gripper, suction gripper and laser pointer
- Gravity feeder with sensor
- Conveyor belt with sensor
- Rotary Table with sensor
- IO experiment table
- Storage and assembly jigs (Palletizing Rack)
- Experiment kits
- Smart sensors and actuators with IO-Link Master (ultrasonic, pressure, RFID, speed, photoelectric, inductive, signal lamp)
- IO-Link monitoring software and bluetooth adapter
- Machine Vision Sensor (Cognex)
- PLC and HMI - Siemens S7 or Allen-Bradley CompactLogix PLC and matching HMI and programming s/w

Why Intelitek SmartCart 4.0

- Industry 4.0 training to prepare students for jobs in the most advanced companies
- Integrated solution with curriculum, exercises, labs, evaluation, and real industrial equipment
- Real industrial equipment used for training
- Multi-technology, flexible, training platform
- Aligned with Micro-credentials and NIMS Industry 4.0 Certification

Industry 4.0 Career Paths

- Robotics Operators and Specialist
- Production Technician
- Maintenance Technician
- Operator/Installer
- Electromechanical Technician
- Industry 4.0 Integrator
- Integration Specialist
- Operations Supervisor
- Mechatronics Specialist
- Applications Engineer
- Systems Operator
- Maintenance Supervisor

INDUSTRY 4.0 PARTNERS

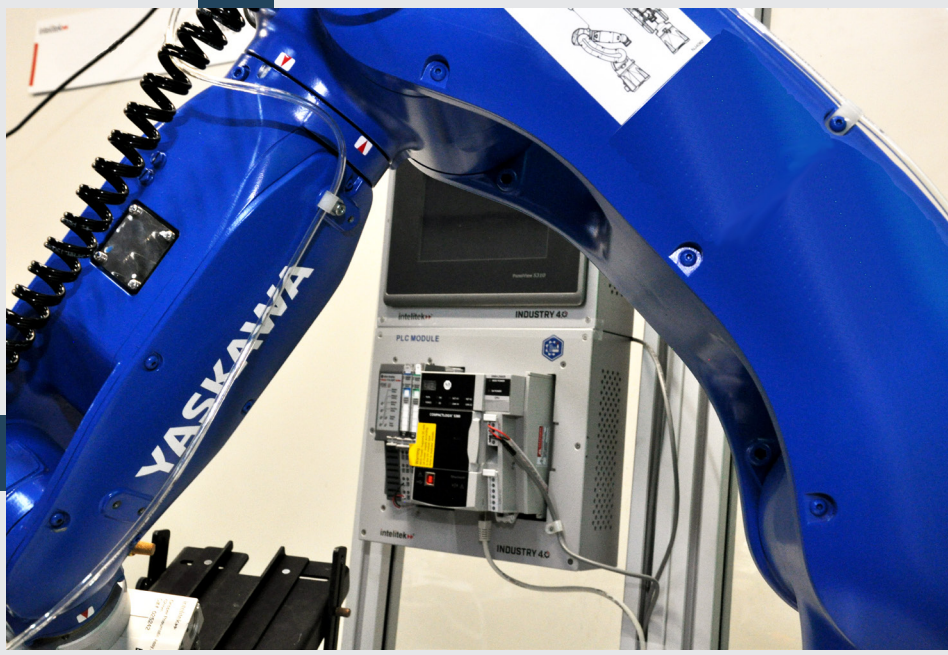
YASKAWA

COGNEX

Allen-Bradley by ROCKWELL AUTOMATION

SIEMENS

NIMS®



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