intelitek ▶▶®
INDUSTRY 4.0
Curriculum

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

Smart manufacturing and Industry 4.0 are a huge shift in how industrial processes work. While the core technology skills are similar, Industry 4.0 introduces new advanced technology, makes extensive use of internet communications, advanced integration, and digital software capabilities that change the environment significantly.

Technicians, operators, engineers and managers need to be proficient in areas of expertise specific to Industry 4.0. Intelitek Industry 4.0 Curriculum offer learners expertise in the broader ecosystem as well as new Industry 4.0 technology innovations.

ALIGNED WITH INDUSTRY NEEDS & CERTIFICATION

- Curriculum and content developed in collaboration with industrial partners and Subject Matter Experts
- Structure aligned with ARM Institute blueprint for Industry 4.0
- Content aligned with emerging Industry 4.0 certification

CURRICULUM FOR INDUSTRY 4.0

Intelitek Smart Series curriculum augment existing advanced manufacturing programs introducing students in different roles to Industry 4.0 theory & technology.

- Tiered program for technician, operator and integrator level students
- Add-on curriculum can be appended to existing advanced manufacturing training programs
- Instructor led or self paced learning programs include instructor aids, class management, assessments and hands-on labs
- Aligned to emerging Industry 4.0 Certifications

CERTIFICATION

Curriculum align with industry certification and in collaboration with industry partners include:

- Yaskawa Certified Robot Operator
- Yaskawa Certified Robot Programmer
- Cognex Certified Vision Programmer
- Siemens Certified RobotExpert/Process Simulate Programmer

INTELITEK INDUSTRY 4.0 CURRICULUM

- Introductory and in depth curriculum covering Industry 4.0 concepts and technology
- Training provides students detailed knowledge of how Industry 4.0 will affect their role and work environment
- Students will understand and learn the benefits of smart maintenance, operational efficiency, remote monitoring and flexible mass production.

TIERED CONTENT ALIGNED WITH JOBS IN INDUSTRY

Multi level, flexible content can be used for different target student audiences.

- Level 1 - Entry level training for technician in production maintenance or production operator role.
- Level 2 - Advanced training for production specialist in maintenance, operator, or implementor role.
- Level 3 - Advanced level training for production integrator in an operator, designer or managerial role.

CERTIFIED INDUSTRY 4.0 CERTIFIED

INDUSTRY 4.0 LEVEL 1 CURRICULUM

Establishing Core Skills

In level 1, students develop a core understanding of manufacturing concepts and components. The program provides an interdisciplinary overview of the theory and technology common in Industry 4.0. The outcome is a core knowledge of systems for an operations or maintenance technician role with responsibility for operation and service of equipment.

Recommended areas of knowledge for level 1 courses

- Foundations of Manufacturing
- Intro Level Electrical & Mechanical Systems
- Intro Level Robotics
- Intro Level Fluid Power
- Intro Level Automation
- Concepts of Advanced Manufacturing

Career Opportunities

- Industrial Maintenance Technician
- Electromechanical Maintenance Technician
- Machine Operator
- Production Technician

Introduction to Industry 4.0

77-3301-0010   15 hours

Introduction to Industry 4.0 offers a window into the impact of the Fourth Industrial Revolution and its accompanying technologies on the modern manufacturing industry. Using examples and analogies from real-world enterprises, the course explores Industry 4.0 concepts, processes, and technologies, and testifies to how these components interconnect together in order to grow the manufacturing industry of the future.

Course Outline

- What is Industry 4.0?
- Technologies that Drive Industry 4.0
- Challenges for Industry 4.0
- Quality 4.0
- Supply Chain 4.0
- Data Standardization
- Internet and Ethernet
- The Internet of Things
- Industrial Control Systems and IIoT
- Big Data
- Automation & Software Technologies
- VR, AR, and AI
- Maintenance 4.0
- Flexible Production
- Maturity Models for Industry 4.0

Introduction to IIoT & Connectivity

77-3301-0011   15 hours

Introduction to the Internet of Things and Connectivity focuses on the vast network of smart sensors and devices and their impact on the manufacturing world. This course also explores topics related to the interconnection of IoT and industrial devices, such as SCADA systems, cloud computing, edge computing, and machine vision systems.

Course Outline

- Introduction to Sensors, Smart Sensors, & Actuators
- Introduction to PLCs
- IoT and IIoT
- IIoT Opportunities, Risks, and Challenges
- The Potential of Connectivity in IIoT
- How a Sensor Connects to the Cloud
- Introduction to Edge Computing
- SCADA Systems
- Vision Systems
- Architecture of Smart Manufacturing Systems
- Introduction to Communication Protocols
- Tracking Methods

Introduction to Networking & Cyber Security

77-3301-0012   15 hours

Introduction to Networking and Cybersecurity is an in-depth look at communication exchange in modern industry, from the Internet to the Industrial Internet of Things (IIoT) and Cloud technologies. The course covers key networking principles, and concentrates on the structure and importance of industry-focused cybersecurity exploring threats that manufacturing entities have to contend with and combat.

Course Outline

- IP Networking Basics
- Communication Protocols
- Cloud Computing
- Components of the Manufacturing Network
- Securing Digital Manufacturing Operations
- Cyber Threats & Basic Cybersecurity Practices
- Essential Cyber System Technologies
- Malware & Malware Protection
- Identifying Cyber Attacks & Cyber Breach Response
- IIoT Cybersecurity Basics
- Cloud Cybersecurity Basics
- Cybersecurity Resources

Introduction to Big Data for Industry 4.0

77-3301-0013   15 hours

The curriculum explores the world of data, including its collection, processing, management, visualization, and its uses. The course delves into big data in cutting-edge manufacturing, and machine learning, predictive analytics, modeling, simulation, improvement of processes and progress indicators.

Course Outline

- Introduction to Big Data
- Characteristics of Big Data and Dimensions of Scalability
- Intelligent Decision Making and Getting Value Out of Big Data
- Data Collection and Management
- Algorithms, Computing, and Descriptive Statistics
- Data Analysis & Visualization of Data
- Predictive Analytics and Modeling
- Machine Learning
- Introduction to KPIs & Improving KPIs with Big Data
- Database Fundamentals including Data Warehousing & Data Mining
- Cloud Computing for Big Data
- Data-Driven Innovation

INDUSTRY 4.0 LEVEL 2 CURRICULUM

Establishing Specialist Skills

In level 2, students become specialists and learn about the entire eco-system and the codependence of elements. The objective is for graduates to be skilled in implementing, operating, optimizing and analyzing the system as a whole. The outcome is to understand how components interact and gain in depth knowledge of operation, programming, and maintenance of the system.

CERTIFIED SPECIALIST LEVEL 2 CERTIFIED

Advanced Industry 4.0 Concepts

77-3301-0015   15 hours

Ths course explores how technologies interact with each other and with industrial components to create efficient, productive, and profitable enterprises. Emphasizing use cases, the course investigates digital threads, flexible manufacturing, and asset tracking.

Prerequisite: Intro to Industry 4.0 (lvl 1)

Course Outline

- Digital Factory Tour
- The Digital Thread
- VR and AR in Manufacturing
- Smart Sensors in Manufacturing
- Cyberphysical Systems
- Flexible Manufacturing Systems
- Additive Manufacturing
- Maintenance 4.0
- Inventory and Asset Management

Advanced IIoT and Connectivity

77-3301-0016   15 hours

Advanced IIoT and Connectivity focuses on the network of smart sensors and devices that is the Internet of Things (IoT) and how systems are integrated and deployed in industrial environments.

Prerequisite: Intro to IoT/Connectivity (lvl 1)

Course Outline

- Smart Sensors
- PLC Functions and Applications
- Machine to Machine (M2M) Communication
- Cloud Connectivity
- SCADA Systems
- Implementing IoT
- Design Modularity in Smart Factories
- Industrial IoT Reference Architecture (IIRA)
- IoT Protocols and Standards
- Material Identification
- Driving Manufacturing with IIoT

Recommended areas of knowledge for level 2 courses

- Advanced Electrical & Mechanical Systems
- Advanced Robotics
- Advanced Fluid Power
- Advanced Automation
- Machine Vision
- Subtractive Manufacturing (CNC Machining)
- Additive Manufacturing (3D Printing)

Career Opportunities

- Robotics programmer
- Mechatronics specialist
- Automation specialist
- Applications Engineer
- Systems Specialist

Advanced Cyber Security for Industry 4.0

77-3301-0017   15 hours

The course explores cybersecurity concepts and investigates the ways that cyber-attacks can occur and be prevented in industrial control systems and IIoT networks.

Prerequisite: Intro to Cybersecurity (lvl 1)

Course Outline

- Cybermonitoring Tools
- Firewalls
- Switch Protection
- Antivirus Installation and Configuration
- Managing Ports and Services
- Cryptography
- IoT Vulnerabilities, Attacks, and Countermeasures
- Secure Design of IoT Devices
- Operational Security Lifecycle
- Identity and Access Management Solutions for the IoT &
- Mitigating IoT Privacy Concerns
- IoT Compliance Monitoring
- Cloud Security for IIoT
- Incident Response and Forensic Analysis
- Performing steps to Establish Persistence in a Compromised network or Device

Software Technologies for Industry 4.0

77-3301-0018   15 hours

This course explores the different types of software that are essential for a production company's success in the automated commercial and industrial landscape.

Course Outline

- Software Technology Overview
- APS - Advanced supply chain & planning systems
- MES - Manufacturing Execution Systems
- ERP - Enterprise Resource Planning systems
- Scheduling Software
- Cryptography
- System Visualization Tools for VR, AR and Digital Twinning
- Quality Control Software
- Artificial Intelligence Software
- Business Intelligence Tools
- Data Modeling Software

INDUSTRY 4.0 LEVEL 3 CURRICULUM

Industry 4.0 Integrator Proficiency

In level 3, students will learn to combine all their skills to develop integrated and complex Industry 4.0 systems. The objective is to learn systems knowledge, sound engineering practices, and the business side of industry process and process design. The outcome will be students able to be part of Industry 4.0 integration, design and planning teams.

Recommended areas of knowledge for level 3 courses

- Manufacturing Processes
- Computer Integrated Manufacturing (CIM)
- Flexible manufacturing Systems (FMS)

Career Opportunities

- Automation/Control Specialist
- Systems Integrator
- Manufacturing/Mechatronics Engineer
- Industry 4.0 Integrator

Advanced Data Science for Industry 4.0

77-3301-0019   15 hours

Data collection, storage, and analytics play a massive role in the manufacturing industry. The vast amounts of data generated by production processes and the potential involved in the use of this data creates substantial economic opportunities for businesses that take advantage of them. Advanced Data Science for Industry 4.0 explores how the proper use of data can help manufacturing enterprises significantly improve their bottom line.

Course Outline

- Data Warehousing
- Data Mining
- KPIs of Big Data
- One Metric That Matters
- Data Driven Innovation
- AI, Machine Learning, and Deep Learning
- Course Project

Industry 4.0 - The Ecosystem

77-3301-0020   15 hours

High level look at the Industry 4.0 Smart manufacturing in industry and the trends and use cases for technology

Course Outline

- Industry 4.0 - The super infrastructure for the future of manufacturing (market trends)
- Requirements for a factory to be Industry 4.0 (technology trends)
- Industry 4.0 and Business processes (Flexible Mass Production)
  - Real time business processes
  - Enhanced customer experience
  - Competitive industrial production
  - Customized mass production
  - Maintaining production (improved reliability/quality)

Industry 4.0 for Business

77-3301-0018   15 hours

A look at industry 4.0 from the business perspective. The course will look at the benefits and justifications for manufacturing.

Course Outline

- Outcomes of Industry 4.0
  - Customer satisfaction
  - Information transparency
  - Customized mass production
  - Intelligent decision making
  - Asset management
- Use cases examples (Case Studies)
- Business with industry 4.0
  - Business 4.0 (business efficiency)
  - Supply chain 4.0
  - Quality 4.0
  - Maintenance 4.0

intelitek ►► ®

📍 18 Tsienneto Road. Derry, NH 03038 USA

📱 +1-603-413-2600

@ info@intelitek.com

🌐 www.intelitek.com