intelitek

INDUSTRY 4.0 CERTIFICATION PROGRAM iCert4.0

As we experience the 4th Industrial Revolution and the rapid change of many industries due to the influx of new technologies, training programs and certifications for skilled labor being hired by employers, needs to be renewed.

Having developed training programs for High Schools, Community Colleges, Universities and Industry for the past 35 years – Intelitek now provides iCert4.0 – a three-tiered program certifying students with Industry 4.0 skills.

Taking a system-based approach, iCert4.0 deals not only with individual components of industrial training, but also with networking and communications, systems integration and the essential employability skills students need in modern industry. Integration of cutting edge technology systems and collaboration is the core of Industry 4.0

iCert4.0 is a modular and sustainable industry aligned certification program with curriculum options to match local industry needs & micro certifications for specific fields that align to advanced industry level certification.

INTELITEK INDUSTRY 4.0 PARTNERS

YASKAWA

SIEMENS

COGNEX

ARM
ADVANCED ROBOTICS FOR MANUFACTURING

Reshaping Manufacturing Training

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

NEW SKILLS/NEW ROLES

- As more complex systems will be integrated both physically, as well as in the cloud, high level system integration will be required. Strong skills in automation, integration, systems, communications, and networking will be required.
- Data collection and analysis from the factory floor will be the cornerstone of production efficiency and predictive/preventative maintenance.
- Robot coordinators will work with all the various tools used to automate processes in the factory.
- Simulation and visualization of system solutions enable viability testing, and will enhance safety and optimize processes before deployment.

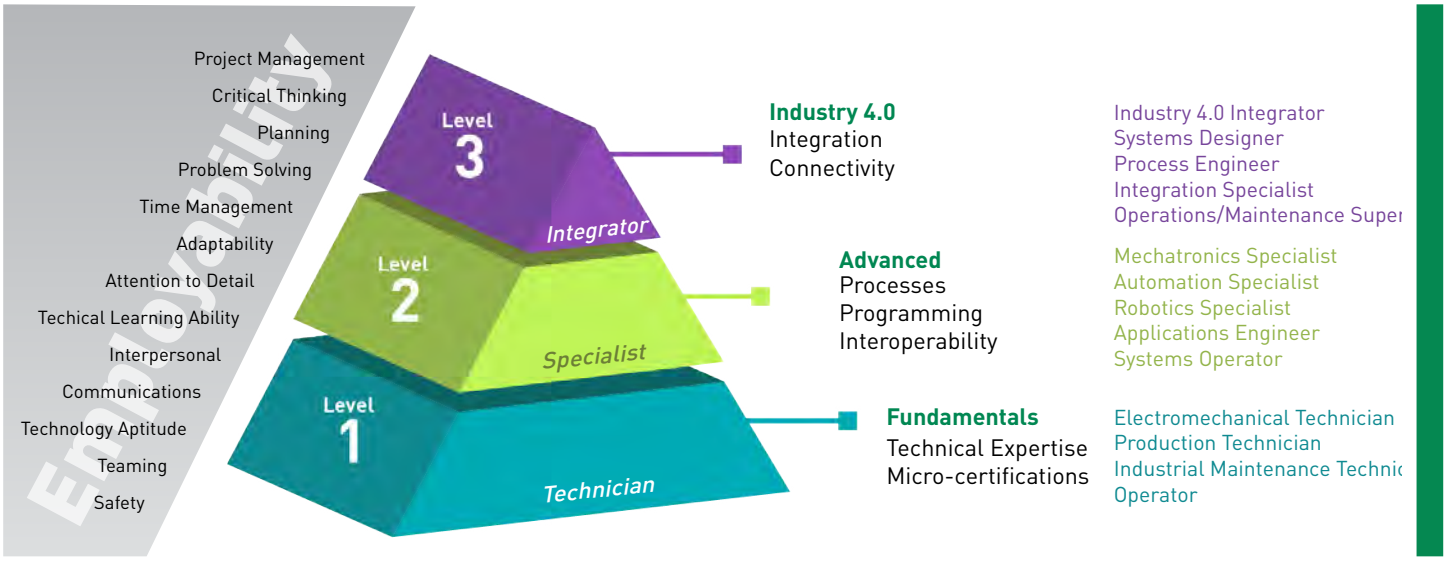
The demand for skilled employees in the manufacturing sector continues to grow. There are more job openings than applicants. This gap is even more severe in advanced positions that require a high level of technical skills in integrating systems and an aptitude to problem solving.

Filling these roles is not only dependent on what we teach, but mainly on how we teach. Intelitek's approach to hands-on learning with integrated programming and operational software and using simulation tools, combined with a heavy focus on Project Based Learning and employability skills, is designed to teach students to adapt and self educate as the world they work in changes.

iCert4.0 graduates employees who are trained to adapt as technology continuously changes.

BUILDING EXPERTISE IN INDUSTRY 4.0 TECHNOLOGIES

Industry 4.0 Fundamentals



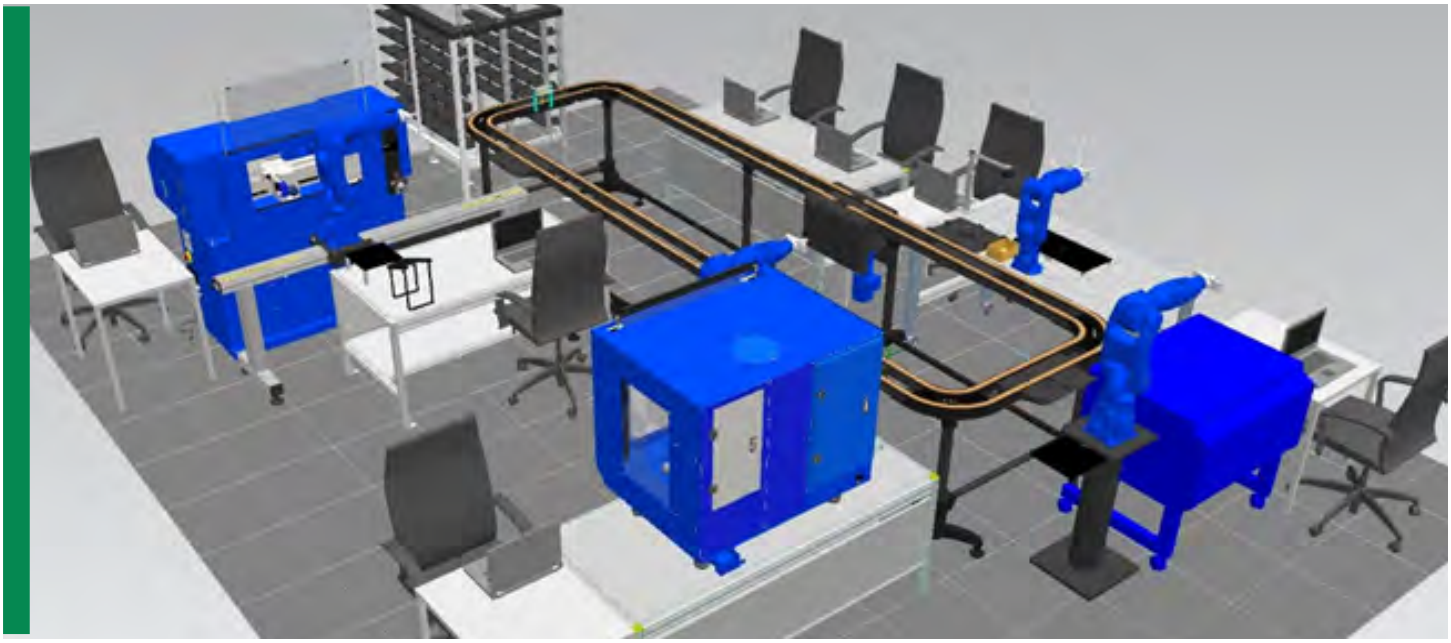
Intelitek industrial Certification Programs

iCert4.0, modelled around the ARM Industry 4.0 blueprint, enables a stackable and modular approach in which certificates and micro-credentials can be awarded to students or incumbent employees in different phases of their academic life or working career. iCert4.0 offers three levels of certification to differentiate between fundamental skills and high-end integration capabilities.

Working with industry and industry training facilities such as RAMTEC, we have crafted a rigorous curriculum delivered through an LMS, as well as smart factory trainers exercising technical, planning and problem-solving skills.

Combined with iCert4.0 are industry grade certifications from leaders like Siemens PLM, Yaskawa MotoMan Robotics and Cognex machine vision. All iCert4.0 certified instructors will be required to complete a Train-the-Trainer program and achieve an instructor certification that qualifies them to provide training and certification to students.

iCert4.0 enables high schools, 2 and 4 year college programs, as well as industry training programs and apprenticeships, to offer valuable credentials to their students that lead to career advancement. iCert 4.0 adopts a matrix approach through which a student can take a single micro-credential in a field of a pertinent employment opportunity, or a certification that covers a wider variety of skills. The skill levels are tiered so students can pursue a fundamental technician tier, and build up towards a specialist or an integrator level.



3D Process Simulation using Siemens RobotExpert

Certification Process

Partnering with Industry

Partnering with leading industry vendors like Siemens, Cognex, and Yaskawa to deliver micro-certifications and aligning our curriculum to the ARM Industry 4.0 blueprint, iCert4.0 covers a wide gamut of required skills. Using the Intelitek blended learning solutions with e-learning content, simulations, training equipment, train the trainer program and the certification assessments of iCert4.0 – students can gain the skills and credentials they need to advance in their careers.

Intelitek is part of the Advanced Robotics for Manufacturing Education & Workforce Advisory Committee. iCert4.0 certification is aligned with ARM Industry 4.0 blueprint for development of federal standards for Industry 4.0 certification.

ARM
ADVANCED ROBOTICS
FOR MANUFACTURING

BENEFITS

- An Industry driven certification
- Stackable and modular – allowing maximum flexibility for students

SOLUTIONS

- Curriculum, software and customizable training labs
- Industry grade equipment and applications
- Covers all skill areas under Industry 4.0
- Train the trainer

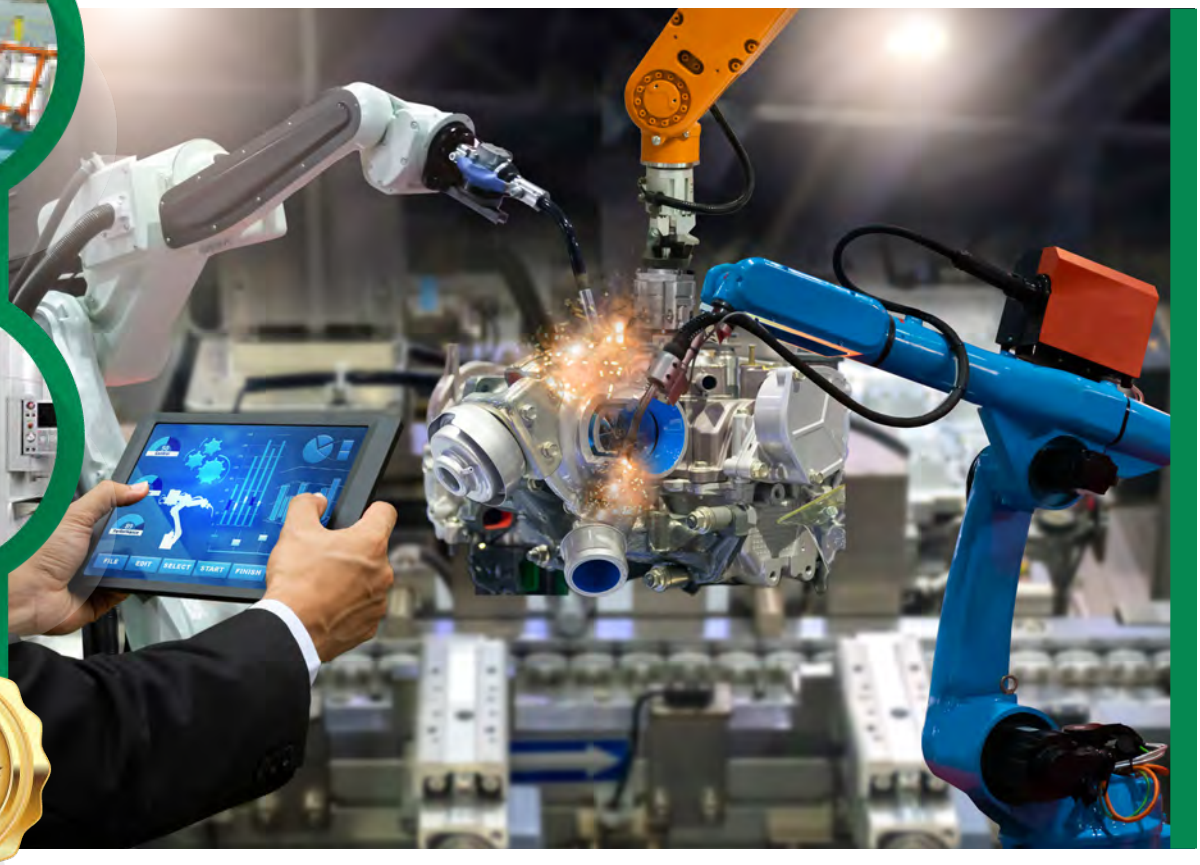
It's All About Employability

Too many certification programs focus on specific equipment or software tool proficiency. However, the concept of Industry 4.0 centers around multi-discpline systems and integration. Industry employers are searching for candidates who have soft skills in addition to technical skills.

In the iCert4.0 program, the core micro-certifications are augmented with modular curriculum, granular content, hands-on projects and exercises in the lab or through apprenticeships. With this interactive, collaborative approach, students learn planning, time management, communcation and job skills that increase their employability

ICERT4.0 ENABLES:

- Advanced level understanding of Industry 4.0 concepts
- The transition between fundamental skills tier to high end integration
- Certifications and micro-credentials



LEVEL 1: FUNDAMENTALS OF MANUFACTURING

Establishing Core Skills

With iCert4.0 level 1, certified students will develop a core understanding of manufacturing concepts and components. The objective is to provide a broad interdisciplinary overview of the theory and parts of any manufacturing plant. The outcome is a broad knowledge of systems for a machine operators or maintenance technician role with responsibility for competent operation and service of equipment.

FOUNDATION SKILLS

- Industrial Safety
- Employability
- Mathematics for Technicians
- Blueprint Reading
- Mechanical Measurement & Quality Control

FUNDAMENTALS OF FLUID POWER

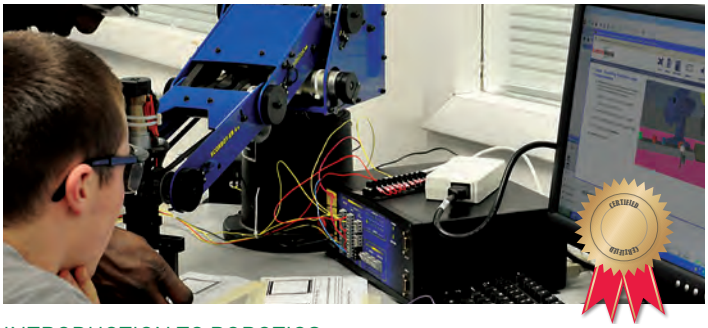
- Fundamentals of Pneumatics
- Fundamentals of Hydraulics

BASIC MECHANICAL SYSTEMS & ELECTRICAL SYSTEMS

- Basic Machines
- Machine Statics & Dynamics
- Machine Shafts & Keys
- Bearings
- Electric Circuits
- Resistors & Conductors
- LCR Circuits
- Motors & Generators

INTRODUCTION TO AUTOMATION

- PLC Technology
- Fundamentals of Ladder Logic
- Sensor Basics



INTRODUCTION TO ROBOTICS

- Fundamentals of Robotics with Yaskawa
- Advanced Robotics with Yaskawa

MANUFACTURING FOR INDUSTRY 4.0

- Introduction to Advanced Manufacturing
- Introduction to Lean Manufacturing

STUDENT WILL LEARN TO:

- Understand safety procedures and operate independently in an industrial setting
- Identify the role of components in manufacturing processes
- Operate and maintain a system at maximum capacity including recognizing, troubleshooting and repairing malfunctions
- Fundamental knowledge of tools, documentation, electromechanical systems. fluid power systems, control systems, and robotics
- Perform maintenance procedures
- Effectively work in a collaborative environment, document clearly and communicate efficiently with co-workers
- Operate a robotic arm
- Operate a PLC, understand the function of PLC automation and perform basic PLC programming
- Describe the function of system components and the interactivity between machines, control elements, and sensors
- Explain the fundamental concepts of Manufacturing in an Industry 4.0 Smart Factory
- Understand the connection of Industry 4.0 and Lean Manufacturing

CAREER OPPORTUNITIES

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

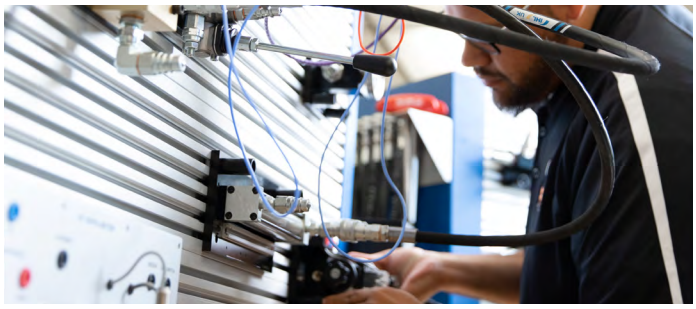
LEVEL 2: ADVANCED MANUFACTURING

Establishing Interdisciplinary Skills

With iCert4.0 level 2, certified students become specialists in manufacturing and learn to understand the entire system and the codependence of units. The objective is for graduates to be skilled in implementing, programming, optimizing and analyzing the system as a whole. The outcome will be that they, as specialists, understand how individual components interact with all other components to make the system run as a unit.

QUALITY CONTROL & ASSET MANAGEMENT

- Machine Vision & Quality Control with Cognex
- Materials Management, Asset Tracking and Storage

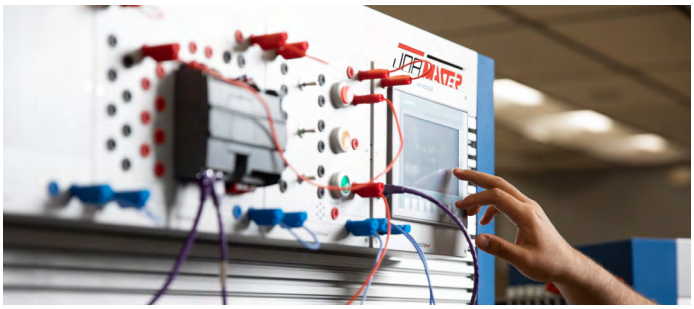


ADVANCED FLUID POWER

- Electro Hydraulics
- Electro Pneumatics

ADVANCED MECHANICAL SYSTEMS & ELECTRICAL SYSTEMS

- Belt Drives, Chain Drives
- Couplings
- Gear Drives, Electric Brakes
- Electrical Control Systems
- Industrial Power Electronics



APPLIED AUTOMATION

- Advanced Sensors
- Advanced PLC Programming Labs with HMI

ADVANCED ROBOTICS

- Robotics and Materials Handling
- Collaborative Robots

MANUFACTURING & MACHINING FOR INDUSTRY 4.0

- Additive Manufacturing with 3D Printing
- CNC Milling
- CNC Turning

STUDENT WILL LEARN TO:

- Understand, operate, troubleshoot and optimize production lines.
- Have a clear understanding how machine vision and image processing works
- Troubleshoot and tune complex electrical and mechanical components of production lines
- Operate a vision sensor, program and implement quality control using vision sensors
- Develop and modify a PLC programs, Program HMI (Human Machine Interface) Applications.
- Integrate sensors and inputs into automation-controlled PLC systems
- Program and edit complex robot applications, integrating robots with other system elements
- Operate additive and subtractive manufacturing machines including an in depth understanding of CNC programming, CAD and CAM software

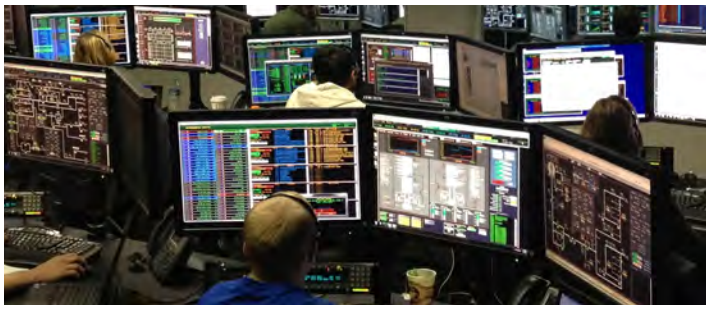
CAREER OPPORTUNITIES

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

LEVEL 3: INTEGRATION FOR INDUSTRY 4.0

Merging Skills into Industry 4.0 Proficiencies

At iCert4.0 level 3, students will combine all their skills to develop integrated and complex Industry 4.0 Systems. The objective is to apply systems knowledge, sound engineering practices, automation and integration techniques into industry process and management. The outcome will be students able to complete an internship, apprenticeship or capstone project where they implement, maintain, or improve Industry 4.0 systems.



COMMUNICATIONS AND NETWORKING

- Introduction to Networking
- Internet of Things
- Cybersecurity

MANUFACTURING PROCESSES SIMULATION

- Manufacturing Processes with Siemens RobotExpert (Introducing Simulation and Augmented Reality)

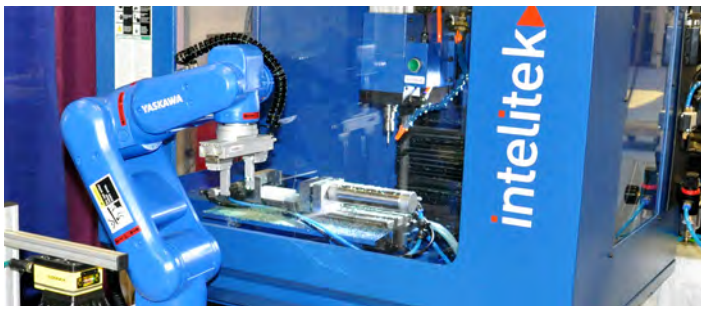
MANUFACTURING INTEGRATION

- Flexible Manufacturing Systems (FMS)
- Computer Integrated Manufacturing (CIM)
- ERP, MES, Data Analytics

CAPSTONE OPTION 1 - INDUSTRIAL MAINTENANCE

Electro-Mechanical Maintenance Cell Project (EMMC)

- System Integration
- Smart Maintenance
- Electro-Mechanical Integration



CAPSTONE OPTION 2 - FLEXIBLE MANUFACTURING SYSTEMS

Robotics Automation Technology Skills Project (RAT)

- Systems Integration with PLCs
- Automated Manufacturing

CAPSTONE OPTION 3 - COMPUTER INTEGRATED MANUFACTURING

Multi-Station Manufacturing Processes Project (CIM)

- Storage & Asset Tracking
- Machining & Robotics
- Networking
- Materials Handling & ERP
- Automation, Integration, MES

STUDENT WILL LEARN TO:

- Understand and explain networking fundamentals.
- Understand the benefits and risks of internet connectivity, IIoT and cloud applications in the context of system and data integrity
- Explain how system modeling and simulation can support design, optimization and maintenance of production systems
- Model and simulate a manufacturing cell and/or system
- Design and implement manufacturing cell or system
- Explain the roles and functions of Enterprise Resource Planning (ERP) and Manufacturing Execution System (MES)

CERTIFICATION REQUIREMENTS:

To complete the program and achieve iCert4.0 credentials, students will participate in a practical program that exercises the theory and concepts they have learned about Industry 4.0.

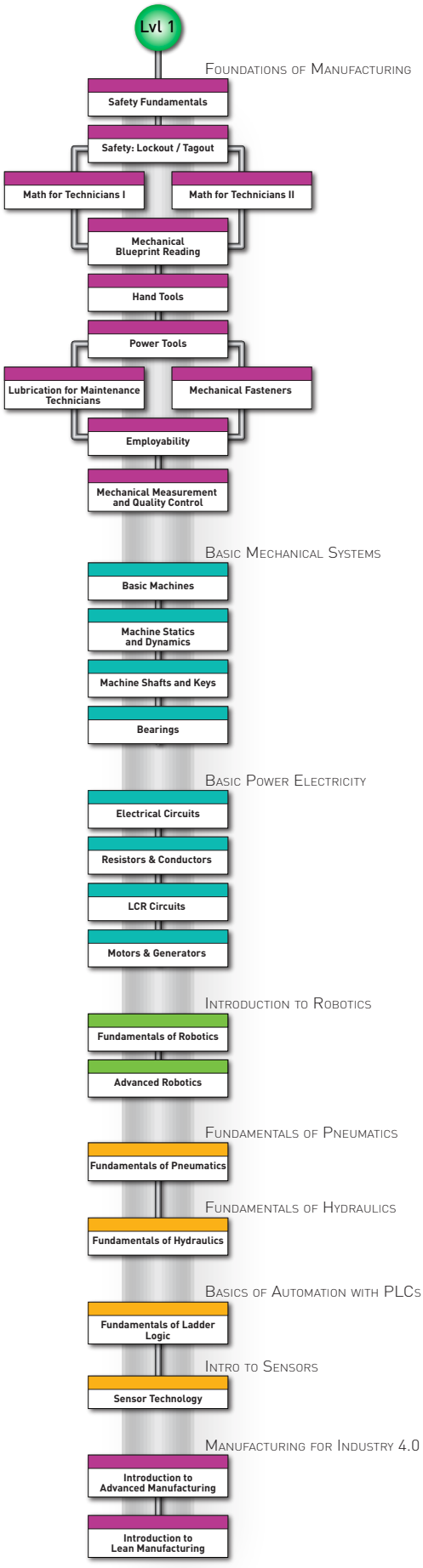
Internship/apprenticeship – students may partake in an industry work/learn program approved by Intelitek where their practical skills will be expanded in the field.

Capstone Project – Intelitek Capstone projects are designed to challenge students to build, program, operate, troubleshoot and integrate a variety of machines, robots, sensors and other components. Using the skills they have learned in the program, students gain hands on experience as they implement projects.

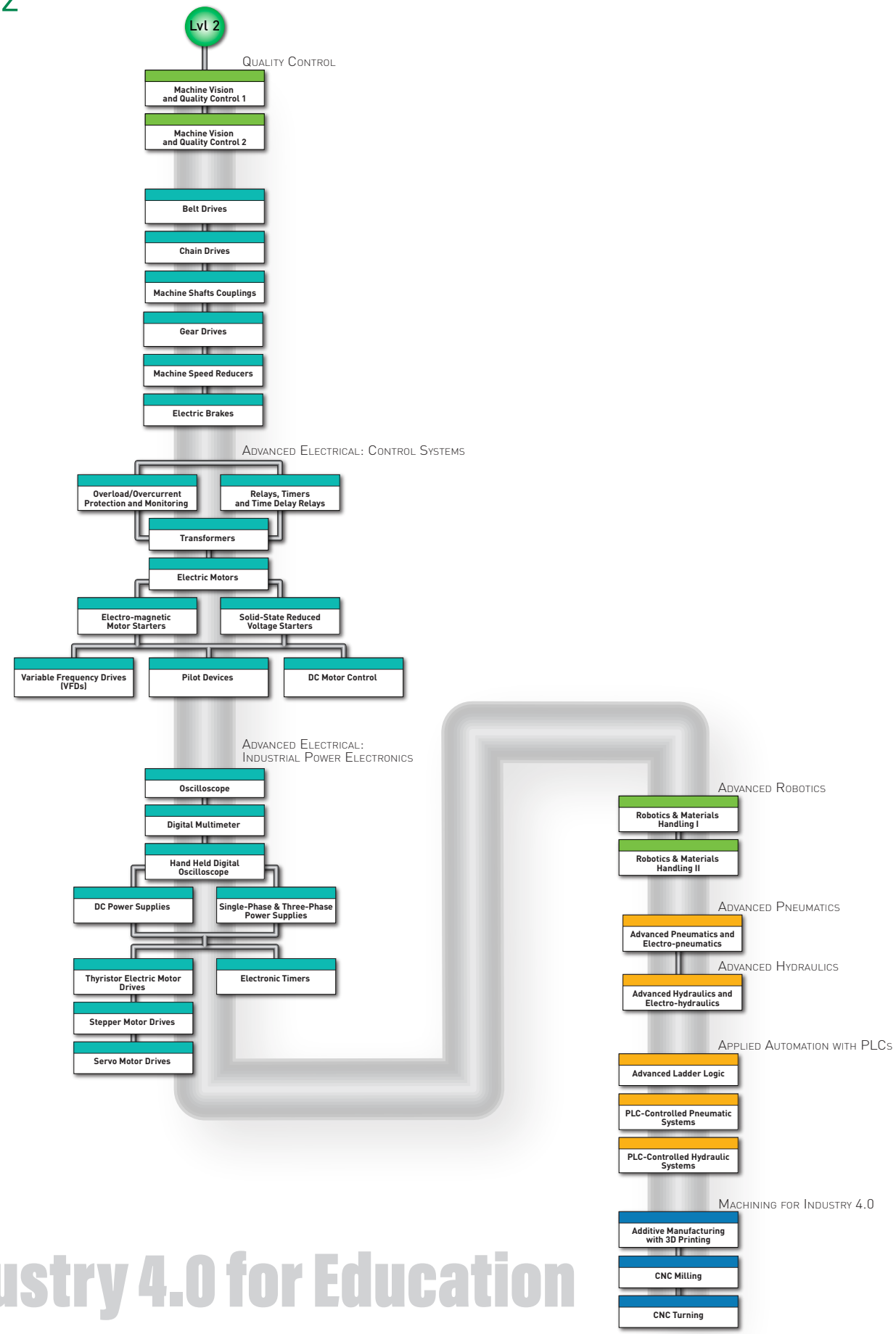
CAREER OPPORTUNITIES

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

iCert 4.0 Course Map
Level 1



iCert 4.0 Course Map
Level 2



Industry 4.0 for Education

iCert 4.0 Course Map
Level 3

Lvl 3

NETWORKING

- Fundamentals of Networking
- IIoT
- CyberSecurity

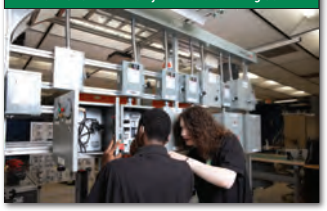
PROCESS SIMULATION

- Manufacturing Process With RobotExpert 1
- Manufacturing Process With RobotExpert II

CIM/FMS

- Flexible Manufacturing Systems
- Computer Integrated Manufacturing 1
- Computer Integrated Manufacturing 2

CAPSTONE: Industry 4.0 Manufacturing Cell



- Build Cell
- Conveyor, Drive and Control
- Part Manipulator, Paint, Bake and Cool
- Industrial Lighting
- Variable Frequency Drive
- DC Motor and Drive
- Network Configuration
- Fault Insertion System

CAPSTONE: Flexible Manufacturing System (RAT)

- Build Cell
- Robotics Programming
- Conveyor, Drive and Control
- Part Manipulator, Feeder. Storage
- Machine Vision
- Control Logic (PLC)
- Network Configuration
- Data Collection and Analysis

CAPSTONE: Computer Integrated Manufacturing

- Build Cell
- Robotics Programming
- Conveyor, Drive and Control
- Part Manipulator, Feeder. Storage
- Machine Vision
- Control Logic (PLC)
- Machining (CNC)
- Robotic Welding
- Network Configuration
- Data Collection and Analysis
- Asset tracking, Inventory, ERP
- Process Management (MES)

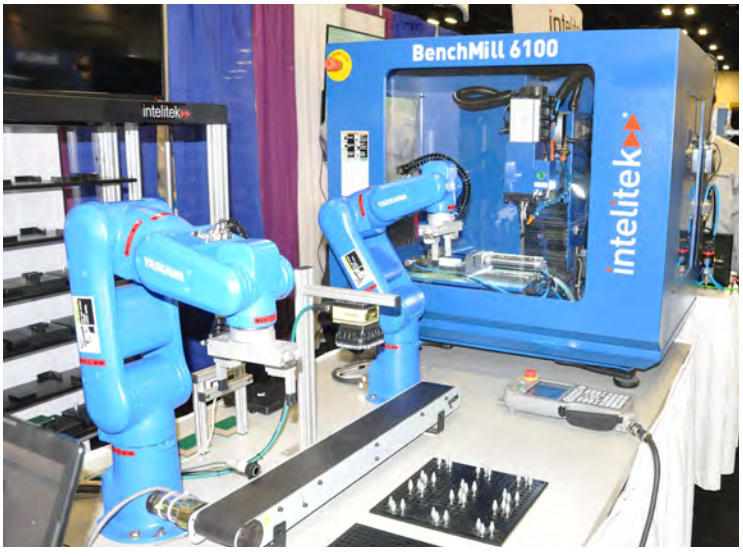
Integrating Learning for Industry 4.0

Computer Integrated Manufacturing (CIM)

At Mississippi Gulf Coast College, students study all aspects of manufacturing and production before embarking on an integration project where the industrial maintenance cell is integrated with a CIM. Students learn robotics, integration, communications and more.

Industry 4.0 Smart Factory Maintenance Cell

At Orange Technical College, in central Florida, students study start with fundamentals of manufacturing before they are introduced to mechanical and electrical systems, robotics and the electromechanical maintenance cell project as part of their Mechatronics studies.



Flexible Manufacturing Systems (FMS)

This configuration of Robotics Automation Technology integrates robotics, machining, materials handling and machine vision. This is a typical integration project students can be tasked to complete as a capstone project to validate their ability to plan, design, build and operate an Industry 4.0 manufacturing station.

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.

Industry 4.0 for Education

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