

CESMII
THE SMART MANUFACTURING INSTITUTE

Skills Needed in the Workforce to Execute the Smart Manufacturing Strategy

Conrad Leiva
VP Ecosystem and Workforce Development, CESMII

Skills Needed in the Workforce to Execute the Smart Manufacturing Strategy

AGENDA

- Skills and training considerations for successful technology adoption
- Education and career pathways for roles impacted
- Balancing internal and external resources for coaching and specialized skills
- Balancing internal and external workforce development options
- Resources available to accelerate manufacturing workforce education on new skills

Manufacturers are Navigating Challenges

Key issues on the mind of industrial leaders

Product and Asset Complexity

- Increasing product complexity
- Integration of smart machinery and systems
- Escalating data demands

Rapidly Changing Workforce Roles

- High retirement and turnover
- Mix of automated and high-skill tasks
- Changing skill requirements and compensation levels

Fast Pace of Technology like AI

- Competitors are adopting smart and AI technologies
- New manufacturing equipment and software is using AI
- The workforce must learn new AI augmented capabilities

Elevated Supply Chain Risk

- Geopolitical and macroeconomic risks
- Logistical strain of short delivery expectations
- Blind spots in deeply tiered supply chain

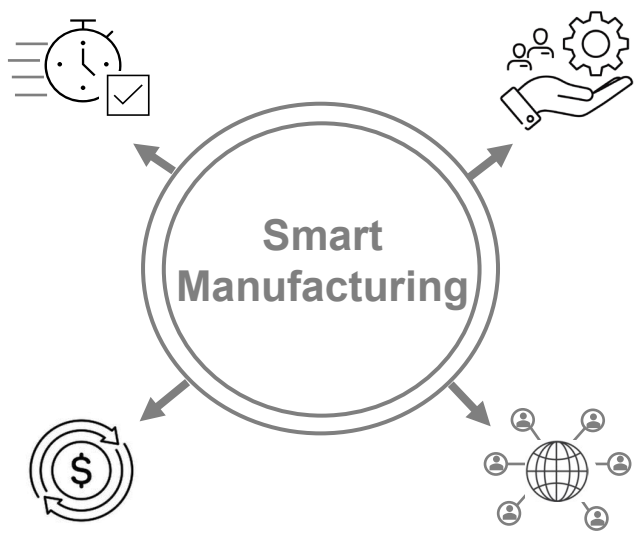
Source: Strategic Improvements Start with Smart Manufacturing, C. Leiva

Manufacturing Strategic Improvements

Start with a Smart Manufacturing Foundation

Differentiating Operational Efficiency

- Process Optimization
- Quality at the Source
- Equipment Reliability
- Work Guidance



Empowered Human Advantage

- Decision Delegated to the Edge
- Knowledge as an Asset
- Skills Academy
- Career Pathways

Unified Operating Model

- Integrated Data and AI Platforms
- Order to Cash Discipline
- Consistent Process Flow
- Innovation Velocity

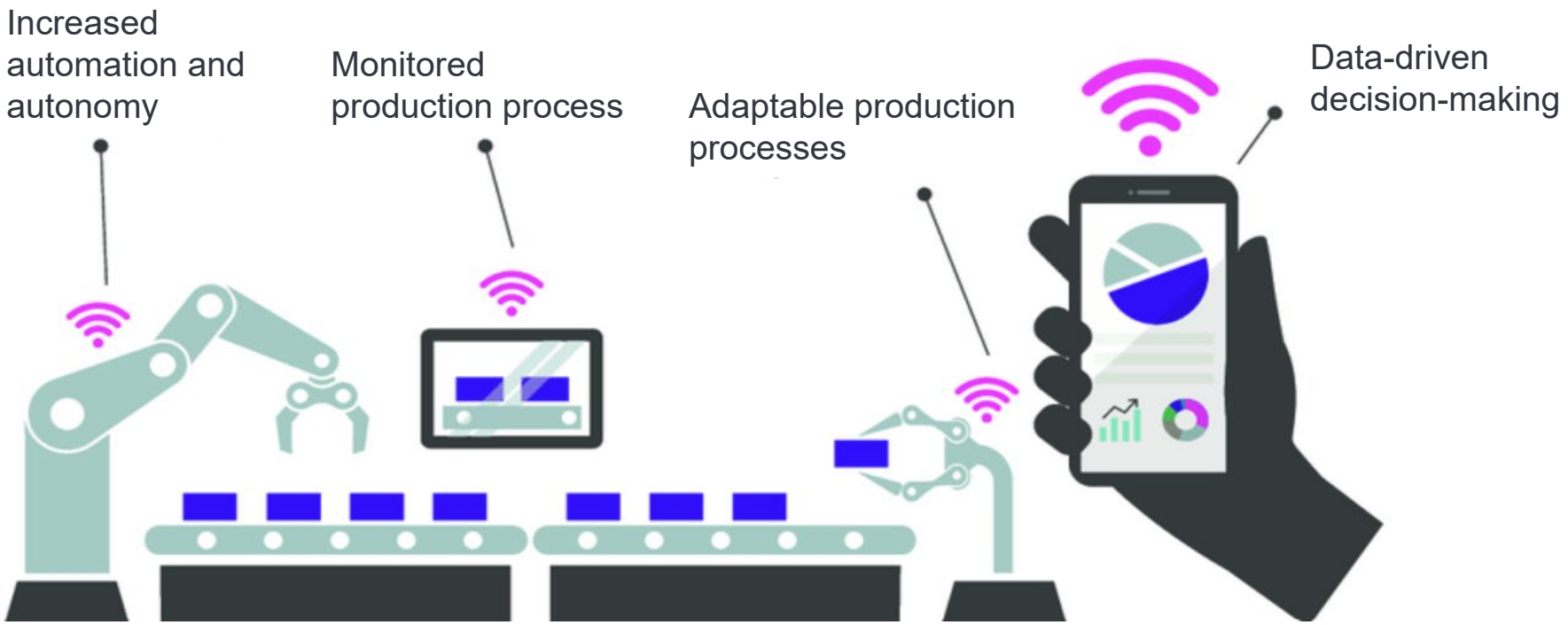
Orchestrated Value Chain

- Schedule and Inventory Coordination
- Data Sharing Partner Network
- Resilient Supply Chain
- Dynamic Production Agility

Image Source: Conrad Leiva

Source: Strategic Improvements Start with Smart Manufacturing, C. Leiva

Real-Time Data is key to Smart Manufacturing



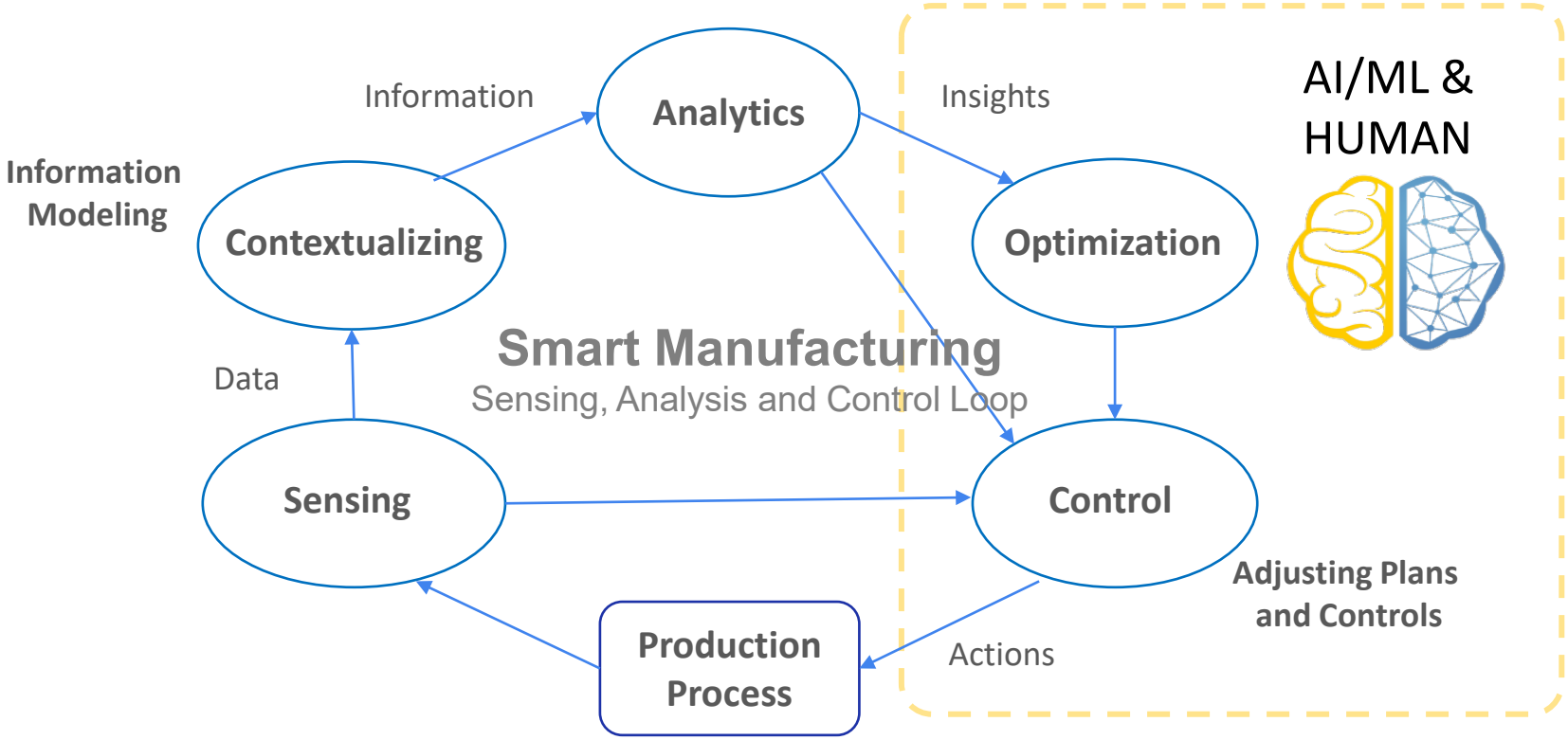
To Gain a Competitive Edge

To Boost Customer Experience

To Enhance Operational Efficiency

To Supercharge Decision-Making

AI Techniques are key to Smart Manufacturing



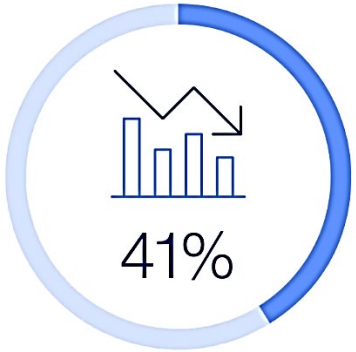
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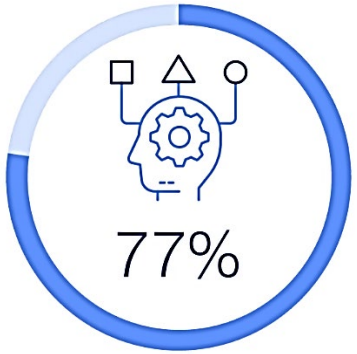
To Enhance Operational Efficiency

To Supercharge Decision-Making

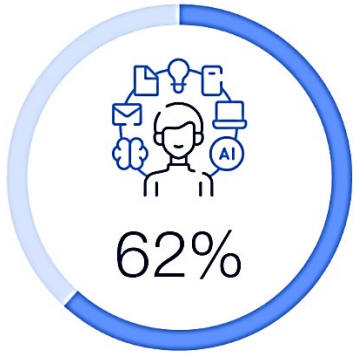
Current Workforce Plans to Adapt New Technology



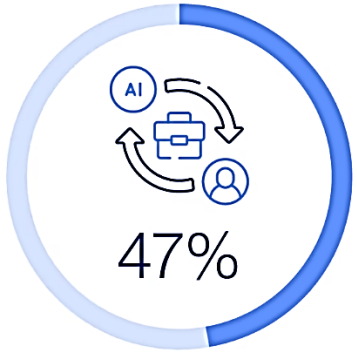
Downsize workforce where technology replaces old roles



Reskill and upskill the existing workforce



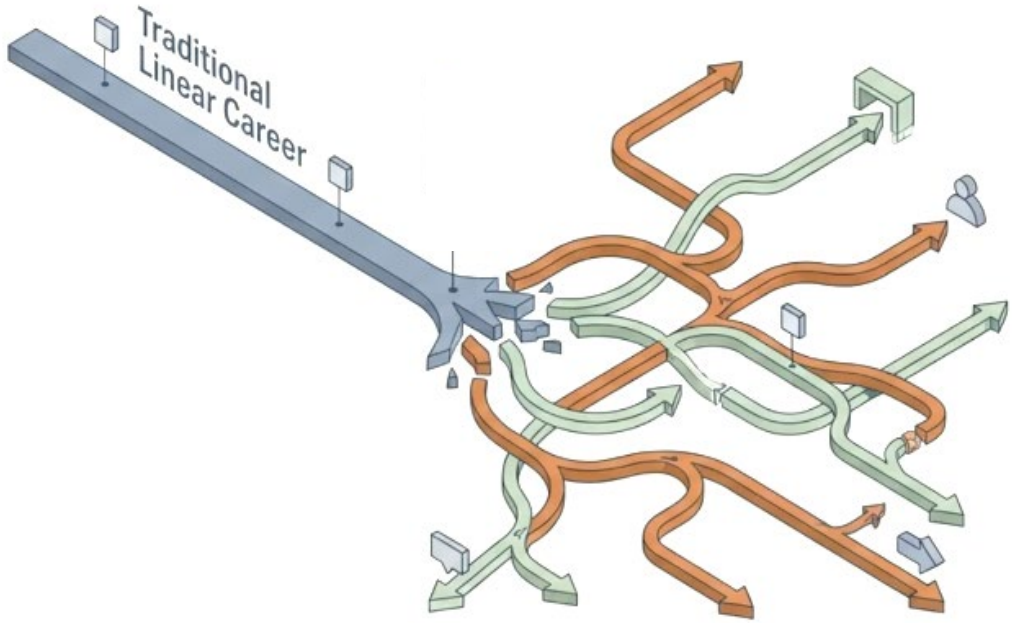
Hire new people with the skills required to use the new technology



Transition people to **new and enhanced roles**

Source: Future of Jobs Report 2025, World Economic Forum, 2025

Plan for Changing Skills and Roles



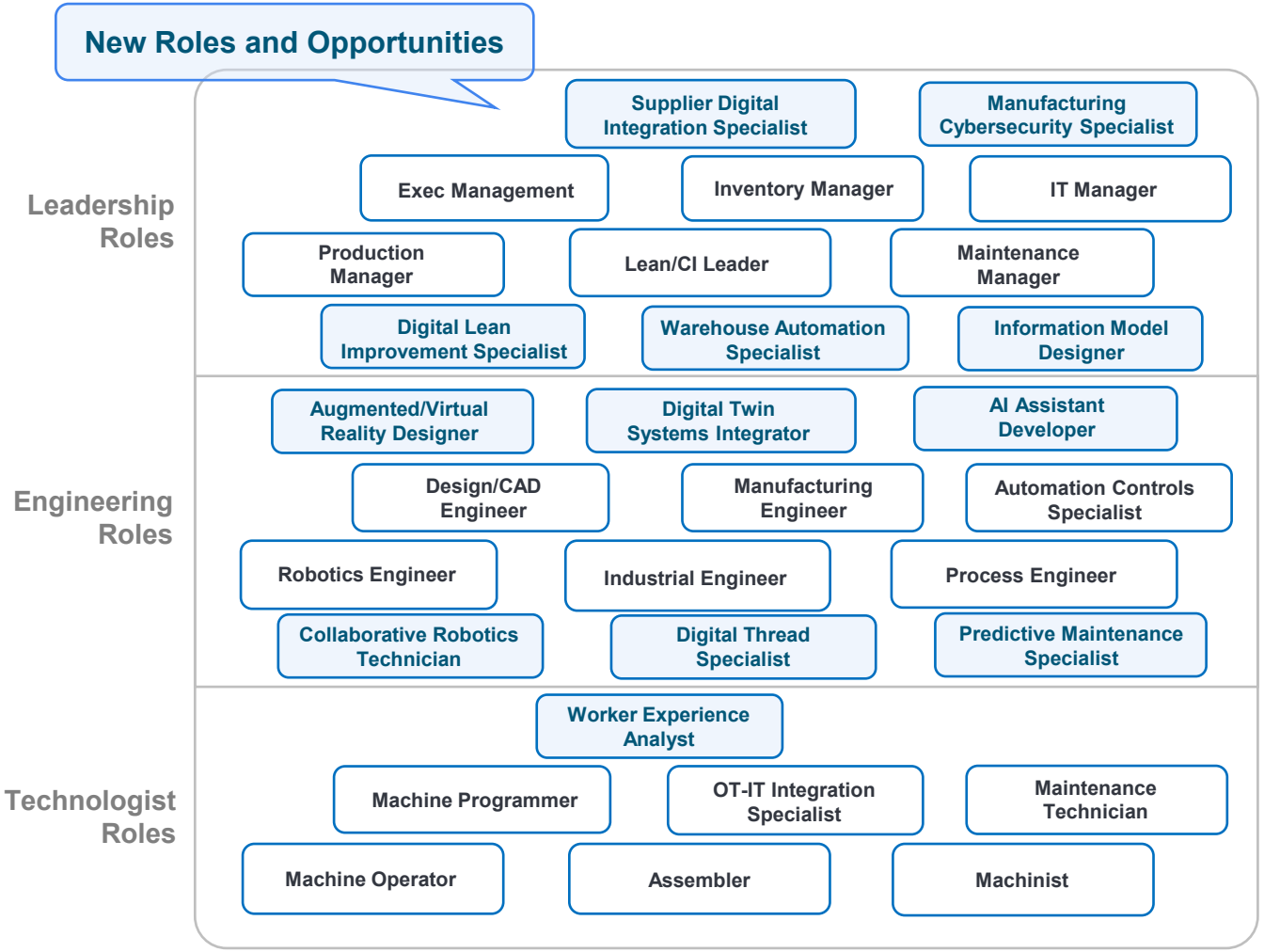
The traditional linear education and career paths are incompatible with the new workforce reality of high turnover, role pivots, and job transitions.

85%

The percentage of workers who will need to fundamentally transition jobs or experience substantial task changes in the next five years.

Image Source: Innovative Human Capital

New Skills Are Needed Across Manufacturing Roles





For Digital Transformation - Leadership Skills Needed

Align Technology and Business Strategy. Maximize business impact by linking every initiative to measurable operational and business goals in a *strategic technology-enabled roadmap*. Smart Manufacturing is not just an IT or OT project; it requires participation from all departments that support Operations.

Improve Open Communication. Communicate the value of the initiative to all stakeholders. Maintain open communication channels between workers, management, and technology teams to ensure that actions are aligned with organizational goals. Encourage feedback and ideas from workers.

Actively Manage Change. Establish team with key stakeholders and stress cross-department innovation. Connect and align teams to ensure that data is shared and workflows are optimized across departments. Manage achievement of milestones towards the desired future-state.



Working with a New Culture and Mindset

New Culture. Foster a culture that values collaboration, innovation, and trust. Ensure that workers feel empowered rather than threatened by technology. Encourages workers to innovate and continuously learn. When people are given the opportunity to participate and contribute, they are more invested as team members.



New Organizational Cohesion. Individuals at all levels of the organization are allowed to share insights. Changes may be required in organizational structure, management practices, and employee incentives. Messaging platforms make it easy for people to interact even when they aren't in the same room.

New Digital Mindset. A digital mindset means that employees understand why the organization needs accurate, real-time data to stay competitive and deliver enhanced service to their customers. The right mindset and culture drives innovation in the organization. For example, Lean Manufacturing practices evolve to Digital Lean practices.

New Ecosystem Mindset. The technology available today can help manufacturers tackle all kinds of problems and reduce costs within their organizations, but the big opportunities lie in optimizing the entire value chain. By leveraging an ecosystem, manufacturers can grow the business and deliver more value through more resources to more satisfied end customers.

Smart Manufacturing - Implementation Skills Needed

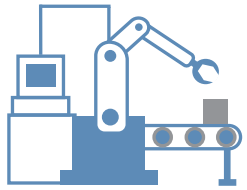


Industrial Data Capture and Organization. The implementation team needs to understand types of manufacturing data, its use and how it is collected and stored. How to connect real-time data sources like machines and IIoT sensors, edge data gateways, wired and wireless networks, and cloud data platforms. Store manufacturing big data using historians, RDBMS, data lake and data mesh methods.

Integration of OT-IT Systems. Integrate data sources, modular applications and platforms for manufacturing operations. Enable real-time and secure data exchange with open standards like OPC UA and MQTT between automation equipment, IIoT sensors, PLCs, SCADA, and production IT systems like data lakes, MES and EAM systems. Organize and aggregate data with context using data models for sharing across systems. Understand OT cybersecurity risk, policies, framework, and tools. Secure layers in the SM infrastructure.

Semi-autonomous Intelligence. Establish a data sharing platform like a Unified Namespace (UNS) to organize and contextualize IIoT data from industrial sources. Collect and prepare operational data to share through information models for downstream use including control, analytics, workflow and AI-enabled applications. Establish a platform for modular manufacturing applications development with no-code or low-code methods.

Updating OT-IT Implementation Skills



INDUSTRY 3.0

Automation, computers and electronics

Late 20th Century

- Data highly siloed
- IT and OT systems separate
- Schedule push driven
- Mass Production
- Lean
- Diagnostic, Reactive Analytics
- Waterfall
- RDBMS, SQL
- On Premises
- Client Server
- PLCs
- C#, HTML, 4GL, Ladder Logic
- Rules-based AI
- Specialty Certified Worker
- Arms-length Supply Chain



INDUSTRY 4.0

Cyber Physical Systems, Internet of Things

Today

- Data transparently shared
- IT and OT systems convergence
- On-demand pull driven
- Mass Customization
- Digital Lean
- Predictive, Prescriptive Analytics
- Agile DevOps
- NOSQL, Hyperledger, Blockchain
- Cloud Computing
- Microservices
- IIoT Sensors to edge or cloud
- Python, Low-code, No-code
- Deep Learning AI
- Flexible Augmented Worker
- Connected Collaborative Ecosystem

For SM Solutions Dev – Engineering Skills Needed



Enhance Human-Machine Interfaces. Leverage technologies like graphical user interfaces, computer vision, instant messaging, augment reality and generative AI to make user interfaces easier to use for the operator.

Develop Dashboards and Data Analytics. Improve visualization of data by implementing intuitive graphs, charts for the workforce that quickly point out good performance or situations that need attention.

Link the Digital Thread and Digital Twins. Develop and link digital twins of processes to their physical twin through the integration of IO-IT systems. Establish a digital thread for product data that provides an integrated view throughout the product lifecycle. For many industries, the digital thread includes data exchange with suppliers to not only reduce risk of suppliers but also capture data on components and materials that folds into the end-product data.

Optimize Production Processes. Use methods including process modeling, simulation, predictive analysis, and AI/machine learning to develop modular smart applications that monitor data and point out potential enhancements for various manufacturing use cases including process control, quality control, and factory flow management.

Implementing AI-based Process Optimization

Examples



Autonomous Process Control

Autonomous systems can provide solutions for manufacturing tasks that are repetitive, dangerous, or require precision. Autonomous triggers can adjust control parameters to improve process efficiency, maintain quality, and reduce machine downtime. AI can trigger human operators for semi-autonomous scenarios.



In-Process Quality Control

Vision technologies can automate measuring components, monitoring tolerance, verifying attributes, collect data, and detect defects. Trigger real-time alerts for out-of-control situations based on statistical analysis and identify potential issues early in the manufacturing process to avoid bigger issues on downstream processes.



Energy Use Optimization

Energy monitoring sensors collect data for real-time process assessment and control. Data feeds physics-based, flow models and machine learning models to prescribe adjustments to operational parameters for energy usage optimization and quality control.



Predictive Maintenance

Connected assets communicate data for diagnostics to centralized predictive analytics and field service personnel. Predictive maintenance insights are combined with connected field services to deliver new levels of reliability.



JIT Inventory Control

Embedded sensors and smart inventory system tracks material and parts across production to adjust inventory levels, allocations, schedules and logistics.

For SM Adoption - Workforce Skills Needed

Increased Automation. Machines and robots are automating routine repetitive tasks and tasks in hazardous environments, such as around extreme temperatures, toxic materials, or working in confined spaces. But engineers are also designing processes to strengthen human-machine collaboration and create workflows that leverage the strengths of both people and machines.

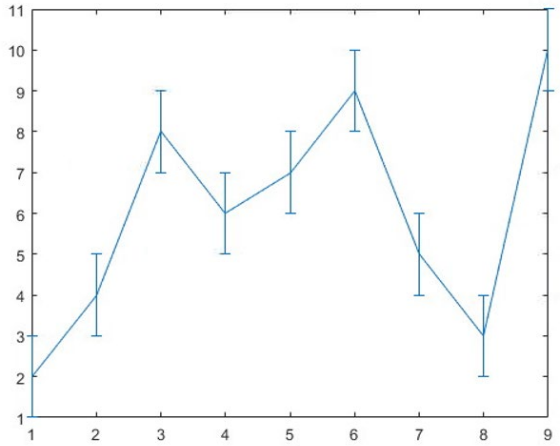


Digital Literacy. The workforce must understand the use of digital tools and smart manufacturing technologies which are increasingly required for their jobs. Workers must learn basic computer skills and Smart Manufacturing concepts like interpreting real-time data in dashboards and interacting with smart machines and systems.

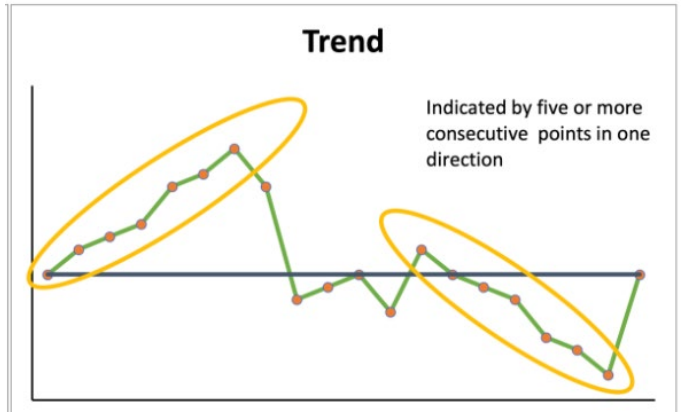
Enhanced Guidance. Digital work instructions, virtual and augmented reality techniques are being used to improve training and guidance for complex tasks. Digital twins and AI-powered assistants will support workers in complex decision-making, offering real-time insights, diagnostics, predictive analytics, and corrective recommendations. Guidance technologies are particularly useful in industries that require frequent product changes or customization, such as electronics or automotive manufacturing.

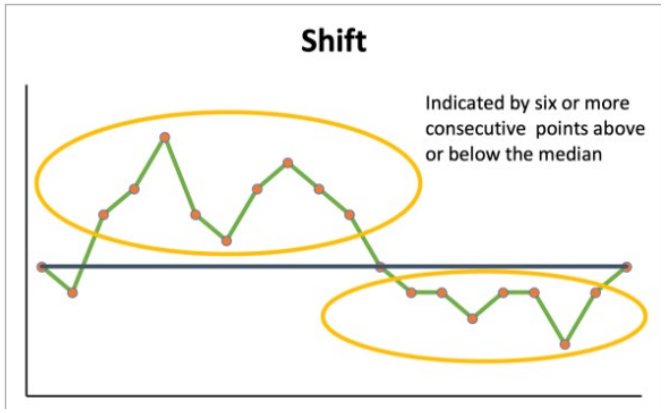
Understanding Visual Insights

Variability

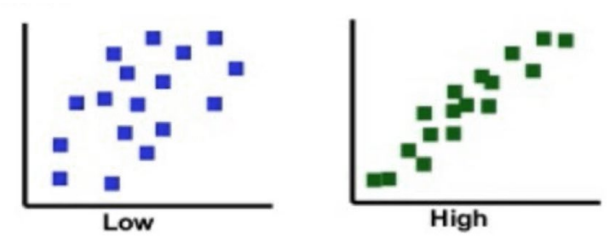


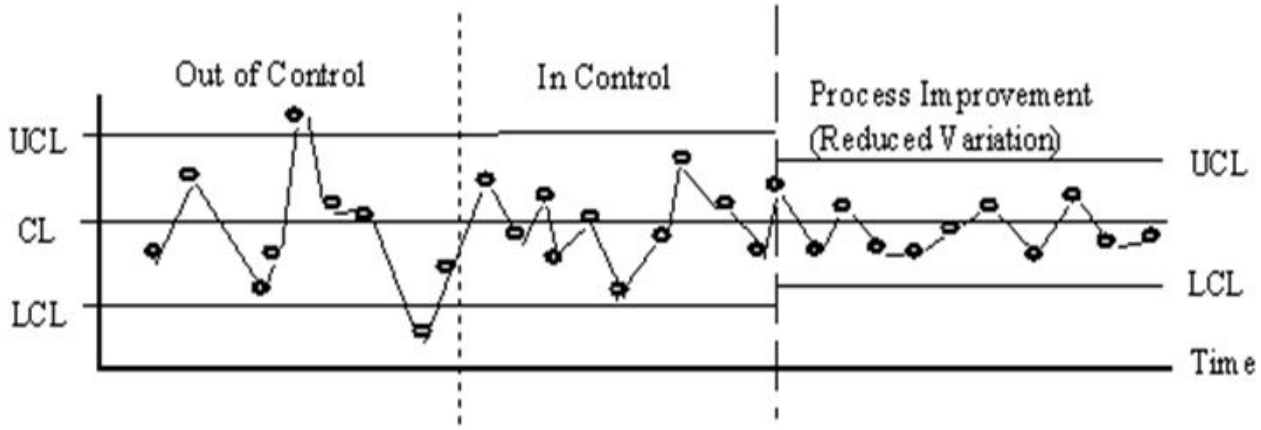
Process Monitoring





Correlation





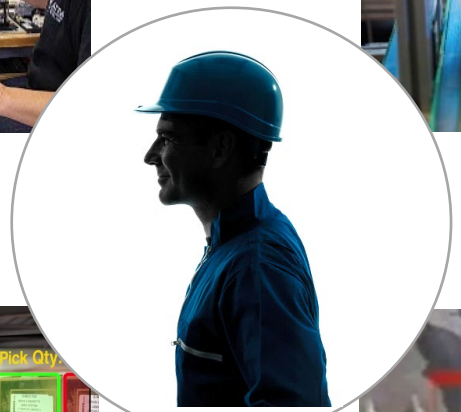
Working with Augmenting Technologies

Examples

Digital Work Instructions

The combination of digital work instructions and AI for real-time contextual information to help guide workers through complex tasks.





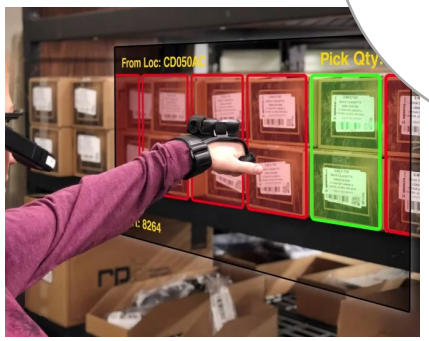


Augmented Reality Assistance

Provide contextual guidance leveraging technologies used include smart glasses, vision and projection systems, and the use of vision through tablet computers.

Vision Parts Picking

Error-proof with systems that recognize and highlight the relevant information on labels to reduce the complexity of picking parts. Worker can be guided with simple color coding and audible signals.





Digital Safety Warnings

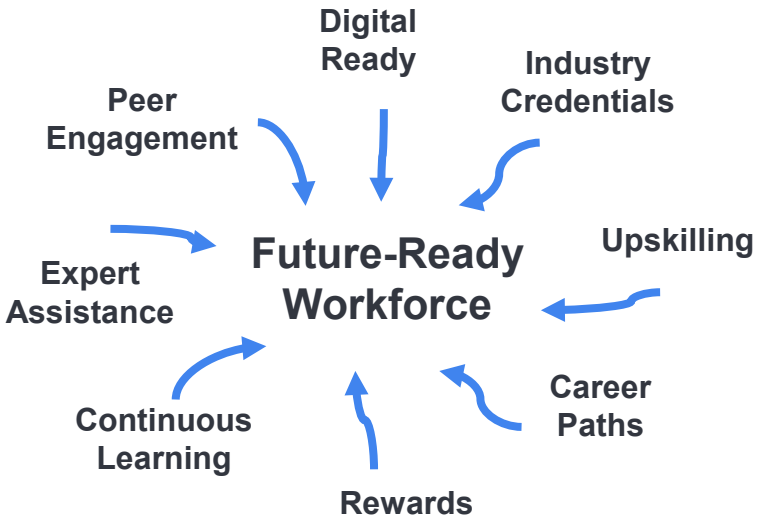
Automated AI-driven safety warnings based on worker location and sensor data can be used to prevent accidents.

Steps to a Future-Ready Manufacturing Workforce

Prioritize Continuous Learning & Development. Encourage a culture of lifelong learning. Invest in training programs that reskill and upskill employees so they can effectively use new technologies.

Adopt Adaptive Workforce Strategies. Build flexible skills into the workforce team so they can quickly adjust to changing technologies and new product lines. Build both technical expertise and soft skills like communication, adaptability, and problem solving.

Enhance Employee Engagement & Support. Increase employee engagement with their peers and provide access to a network of experts that can support them when they need assistance.



Provide Education and Career Pathways. Establish clear career pathways that help employees see growth opportunities in an increasingly automated and dynamic environment.

Partner with Educational Institutions. Embed industry micro-credentials into job descriptions and partner with local community colleges for pipeline and workforce development training on these micro-credential skills.

Balancing Internal and External Specialized Skills

Define Strategic Roles. Define roles and tasks that are better filled by internal employees because they require deep firm-specific knowledge or long-term continuity.

Evaluate Cost and Risk. Internal hires are more cost-effective over time and offer lower risk. External contractors are ideal for urgent or niche skills that are not needed all the time.

Establish a Hybrid Model. Define roles and tasks that can be executed by external contractors with specialized skills that are needed temporarily or for defined-scope projects. Maintain a "talent database" of past contractors with specialized skills.

Balancing Factors	Favor Internal Staff	Favor Contract Labor
Time Horizon	Ongoing need (> 1 year)	Temporary/Project-based (<1 year)
Skill Type	Firm-specific, Proprietary	Niche, Highly specialized
Urgency	Competitive advantage	Easy to hire when needed
Management	Requires oversight	Independent, specialized skills
Cultural Need	High cultural integration	Limited collaboration required

Audit Internal Skills. Assess where the organization has skill gaps in critical areas and actively build internal skills where needed through training programs to reduce reliance on external contractors over time.

Onboard for Speed. Develop a standardized, fast onboarding process for internal and external personnel to maximize productivity instantly.

Combining Internal and External Training



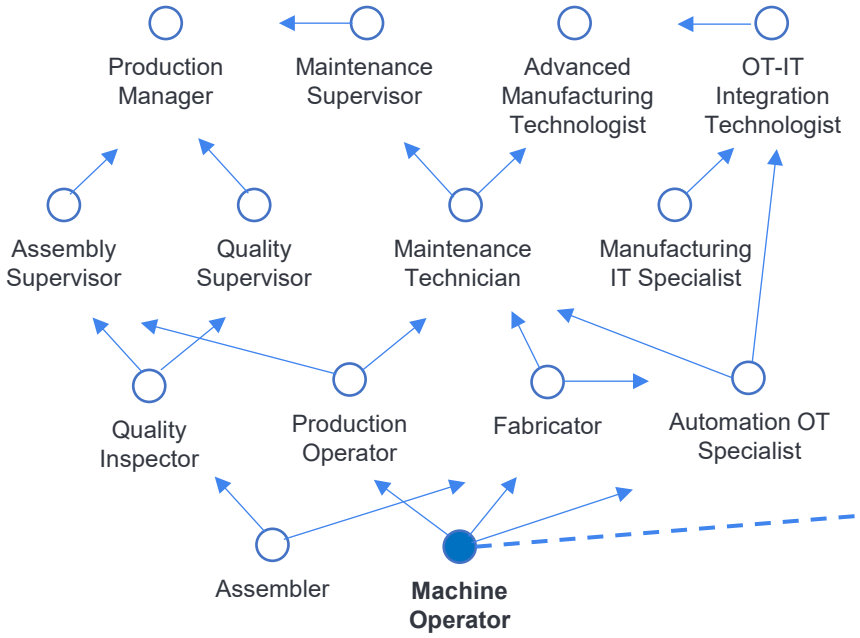
Internal Training

- **Best for company's custom processes**, workflows, software, and niche subject matter not taught in the mainstream market.
- **Can be cost effective in the long run** but higher upfront cost of development and subject-matter-expert time.
- **Takes up time from staff** which impacts regular tasks.
- Can be done through on-the-job training and recording of subject matter experts.

External Training

- **Ideal for standardized, universally applicable topics** (e.g., leadership development, programming, AI, and Smart Manufacturing).
- **Minimum upfront cost but ongoing fees** can be expensive for large company-wide rollouts.
- External trainers can be expensive, but **specialist knowledge might not be available internally**.
- **Leverage third party online training** like LinkedIn Learning and ToolingU courses.
- Start with industry micro-credentials as a framework and training partnerships with community colleges.

Providing Career Pathways to your Workforce



Machine Operator

In a Machine Operator role, you control nearly every aspect of the manufacturing process in any facility that creates and distributes products. You set up machines, ensure they are properly maintained, and, of course, operate them to manufacture a product. You uphold company standards and ensure the manufacturing process runs safely and efficiently. You identify and troubleshoot problems with existing machines, and you work with others on your team to come up with solutions. An individual who pays attention to detail and quality would make a good Machine Operator.

Required Education & Training
- High School Diploma or Equivalent

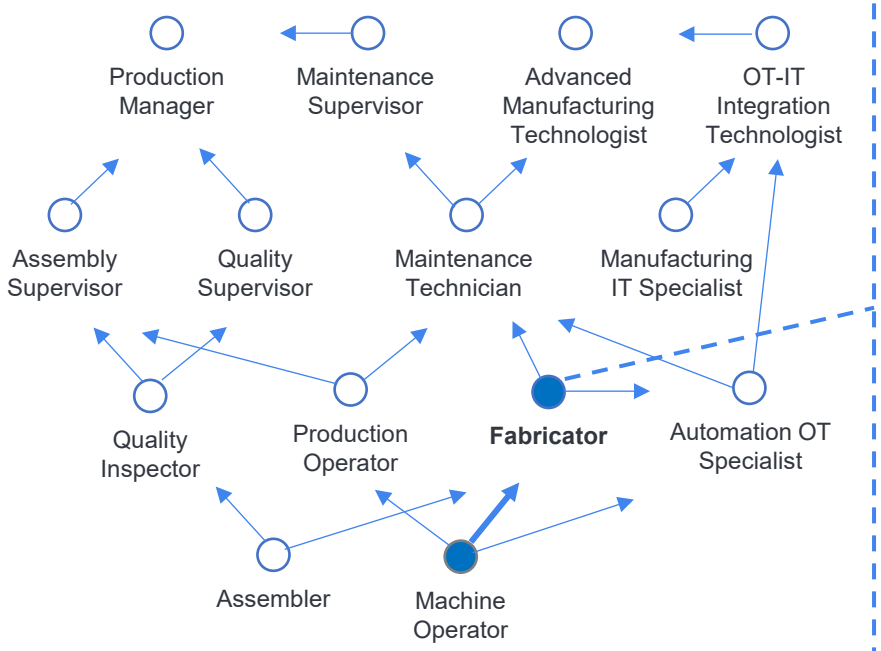
Work Experience
- 1 year

Pay
- $36,000 - $52,000 / year

Skills & Requirements
- Communication: The ability to communicate clearly with teammates and supervisors, especially as problems arise with machines, materials, or personnel, and offering solutions where possible is essential.
- Operation: Operate diverse machines related to the manufacturing process. Measure with precision measurement tools and dimensional metrology. Inspect materials and parts. Plan job, load parts, follow set up sheets. Operate presses, grinders, hones, milling/turning equipment. Perform benchwork including deburring and cleaning parts. Inspect equipment, perform maintenance and repairs, and recommend and follow up on machine adjustments to improve performance.
- Proactivity: Machine Operators stay up to date on and closely observe assembly and maintenance instructions. Be proactive about acquiring and maintaining any necessary certifications required for the position.
- Physical stamina: Ability to stand, walk, bend, kneel, and lift or push weights up to 50 pounds is important in this role.
- Experience: Previous experience in a manufacturing environment preferred. Typically requires 6-12 months of machine operator experience.

Reference: https://advancedmanufacturing.careerpathplatform.com/map/

Providing Career Pathways to your Workforce



Fabricator

As a Fabricator, you specialize in manufacturing and assembling equipment or devices, ensuring every product's quality and efficiency. You conduct verification processes on product schematics and specifications, perform quality control inspections, and test the product in different environments. You coordinate with others in the company to remain informed on any changes or updates in the production operations. You ensure the process adheres to the company's policies and safety standards. A Fabricator role is a great fit for individuals who can communicate well with others and have a passion for engineering.

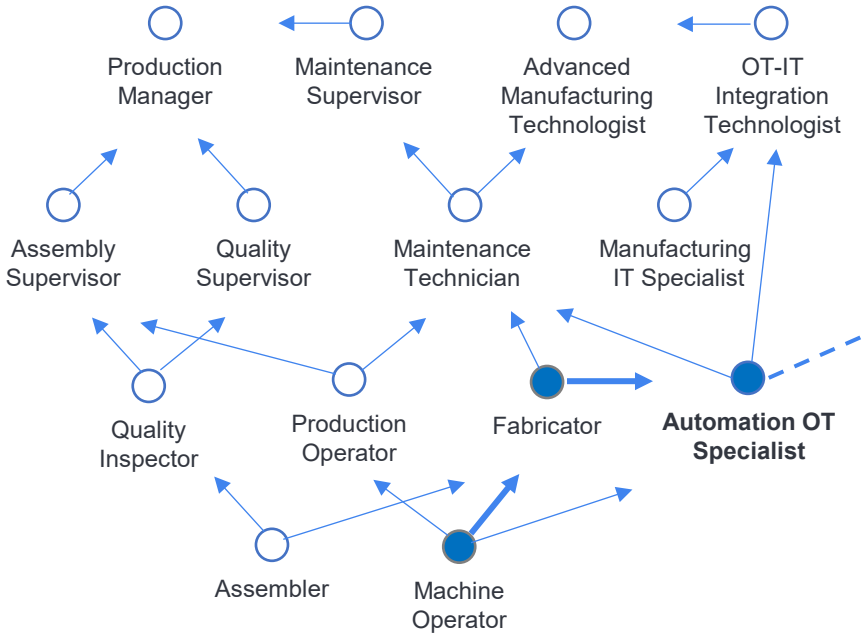
Required Education & Training
- High School Diploma or Equivalent

Work Experience
- 1-2 years preferred

Pay
- $37,000 - $65,000 / year

Skills & Requirements
- Critical thinking: The ability to diagnose mechanical and hydraulic breakdowns on process or process support machines and equipment is important to the Fabricator role.
- Operation: Interpret all types of blueprints and GD&T. Run variety of machines (lathes, mills, CNC). Set appropriate feeds and speeds. Inspect parts to verify specifications are met. Adjust process to achieve tolerances and finishes.
- Mechanical skills: Repairs may necessitate dismantling, replacing, testing, and operating mechanical and hydraulic systems or components.
- Proactive: Being actively involved with the preventive maintenance of process equipment and facilities as required in accordance with production schedules is desired.
- Mobility: Fabricators handle and move material in and about the process area and plant making mobility essential.
- Physical stamina: Fabricators must be able to lift 50 lbs. and stand for a period. The job also requires frequent lifting, routine bending, leaning, reaching, kneeling, etc.

Providing Career Pathways to your Workforce



Automation OT Specialist

Assist engineers in such activities as computer-based process control and instrumentation. Support multi-discipline manufacturing processes with respect to the repair, maintenance, installation and/or enhancement of machinery and equipment or interrelated systems. Consult with machinists or technicians to ensure that electromechanical equipment or systems meet design specifications and install or program computer hardware or machine or instrumentation software in microprocessor-based systems. At times you might analyze engineering designs of logic or digital circuitry, motor controls, instrumentation, or data acquisition for implementation into new or existing automated, servomechanical, or other electromechanical systems. Throughout your day you could be modifying, maintaining, or repairing electrical, electronic, or mechanical components, equipment, or systems to ensure proper functioning. This is a great position for someone who likes working with their hands in a fast-paced environment.

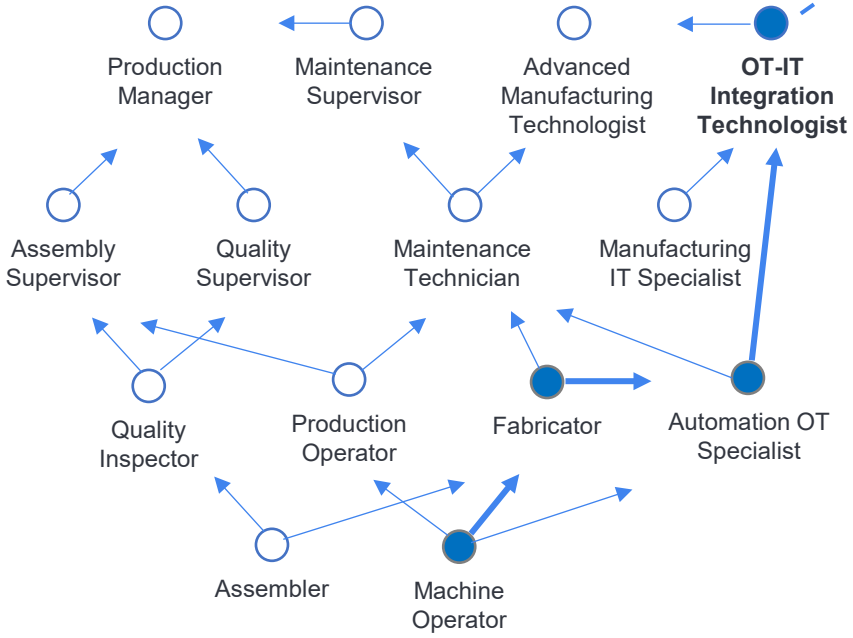
Required Education & Training
- High School Diploma or Equivalent

Work Experience
- 2-4 years preferred

Pay
- $48,000 - $77,000 / year

Skills & Requirements
- Automation Technology: Must understand the practical application of manufacturing technology. This includes applying principles, techniques, procedures, and equipment to the production of various goods and services, including machines and tools and their use, repair, and maintenance.
- Operation. Production equipment and precision instrumentation installation, alignment, maintenance. Determine appropriate machine tools. Write programs to meet process specifications. Production control programming including PLCs, CNC and HMI. Monitor and troubleshoot machine operation.
- Computers and Electronics: Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming will specialist well.
- Complex Problem Solving: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions; especially if the manufacturing production process goes down.
- Critical Thinking: Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems in the manufacturing process.
- Education: High School diploma or equivalent. A two-year technical degree is preferred.

Providing Career Pathways to your Workforce



OT-IT Integration Technologist

Assist engineers in such activities as computer-based process control and instrumentation. You will support multi-discipline manufacturing processes with respect to the repair, maintenance, installation and/or enhancement of machinery and equipment or interrelated systems. You often consult with machinists or technicians to ensure that electromechanical equipment or systems meet design specifications and install or program computer hardware or machine or instrumentation software in microprocessor-based systems. Throughout your day you could be modifying, maintaining, or repairing electrical, electronic, or mechanical components, equipment, or systems to ensure proper functioning. This is a great position for someone who likes working with people and with their hands in a fast-paced environment.

Required Education & Training
- High School Diploma or Equivalent

Work Experience
- 3-5 years experience
- Degree preferred

Pay
- $57,000 - $101,000 / year

Skills & Requirements
- Automation Technology: Must understand the practical application of manufacturing and information technology. This includes applying principles, techniques, procedures, and equipment to the production of various goods and services, including machines, connectivity devices and systems and their configuration, use, repair, and maintenance. SCADA and HMI design, configuration and programming. Plan workflow and integrate production cell.
- Information Technology: Implement and maintain production systems including MES, quality and asset management systems. Knowledge of production and sensor equipment, computer hardware and software, programming and integration of production systems.
- Complex Problem Solving: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions; especially if the manufacturing production process goes down.
- Critical Thinking: Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems in the manufacturing process.
- Education: High School diploma or equivalent. A two-year technical degree is preferred.

Why Standard Industry Micro-credentials?

Nationally accepted. Micro-credentials are validated by industry experts and are gaining wide adoption among industry and community colleges across many states.

Flexible education and career pathways. Modular and stackable skills training and competency testing allows workers to upskill while they continue to work. Competency-based assessments provide accelerated path for workers obtaining competencies through work experience.

Shorter path to job-ready talent pipeline. Students can start obtaining micro-credentials through CTE programs at high school and continue stacking them through their career.

Quicker to evolve. Modular micro-credentials can be developed quicker to keep pace with new technologies and industry techniques.

Rigorous development process. Make sure to adopt micro-credentials with a development process that follows the ISO 17024 standard.

New SACA Smart Manufacturing Micro-credentials

C-217 Smart Manufacturing Fundamentals

The purpose of this credential is to certify that individuals can describe the principles, technologies, and applications of Smart Manufacturing, Industry 4.0, and the Industrial Internet of Things (IIoT) and how they affect the competitive position of manufacturers. Further, individuals must be able to safely operate basic smart automation systems that use Human Machine Interface (HMI) panels, monitor system operation parameters and energy usage using HMI visualization software, and connect/test to smart devices through point-to-point Ethernet communications.

C-218 Smart Manufacturing Data Acquisition

The purpose of this credential is to certify that individuals can identify types of manufacturing data and its function, describe how smart manufacturing data is collected and stored, set up and operate a dedicated cloud-based data acquisition system, interface and test analog and discrete sensing devices, configure and test wired and wireless Ethernet communications to sensors, and view data stored in a dedicated data acquisition system.

C-219 Smart Manufacturing Visualization and Data Analytics

The purpose of this credential is to certify that individuals can organize and interpret data using a variety of visualization methods, set up and operate visualization displays using dedicated and controller-based data acquisition systems, set up programmable controllers to collect data, configure Bluetooth technology to transfer information between devices, use OPC server software to facilitate data exchange between a smart device and a database or another smart device, set up Excel Spreadsheet, and use Excel to analyze data.

C-220 Smart Manufacturing Data Transmission and Cybersecurity

The purpose of this credential is to certify that individuals can assess potential cyber security threats to an industrial smart manufacturing system and data transmission methods, use best practices to protect stored and transmitted data against cyber security attacks, respond effectively to cyber security attacks, and set up secure industrial local area networks and firewalls.

C-221 Smart Manufacturing OT-IT Integration (Coming Soon)

The purpose of this credential is to certify that individuals can configure and operate various types of edge and cloud software including SCADA, OPC-UA server, MQTT broker, and SQL Database to enable real-time data exchange with open standards like ISA-95, OPC UA and MQTT between automation equipment and IIoT sensors (a.k.a. Operational Technology – OT), and enterprise systems like Manufacturing Execution Systems (MES) and Enterprise Asset Management (EAM) systems (considered part of the Information Technology systems – IT) . Individuals shall also demonstrate the ability to configure various types of visualizations and organization of the data for use in dashboards and analytical applications.

C-222 Smart Manufacturing OT-IT Semi-autonomous Intelligence (Coming Soon)

The purpose of this credential is to certify that individuals have the foundational skills for designing and working with a Unified Namespace (UNS) to organize and contextualize IIoT data from industrial systems. Individuals will demonstrate the ability to collect, model, and prepare operational data for downstream use, including analytics and AI-enabled applications. The credential emphasizes preparing high-quality, well-structured data suitable for programmatic or AI-based workflows, and includes practical experience using Python to access, transform, and analyze industrial data.

Stack Micro-Credentials for Career Pathway Options

Control Systems Specialist

C-208 PLC Troubleshooting 1
C-207 Programmable Controller Systems 1
C-206 Electrical System Installation 1
C-205 Sensor Logic Systems 1
C-204 Motor Control Troubleshooting 1
C-203 Variable Frequency Drive Systems 1
C-202 Electric Motor Control Systems 1
C-201 Electrical Systems 1



Industrial Automation and IT Integration Specialist

C-217 Smart Manufacturing - Fundamentals
C-218 Smart Manufacturing - Data Acquisition
C-219 Smart Manufacturing - Visualization and Data Analytics
C-220 Smart Manufacturing - Data Transmission & Cybersecurity
C-221 Smart Manufacturing - OT-IT Semi-autonomous Intelligence
C-222 Smart Manufacturing - OT-IT Integration

C-212 Ethernet Communications 1
C-213 Smart Sensor & Identification Systems 1
C-214 Smart Factory Systems 1

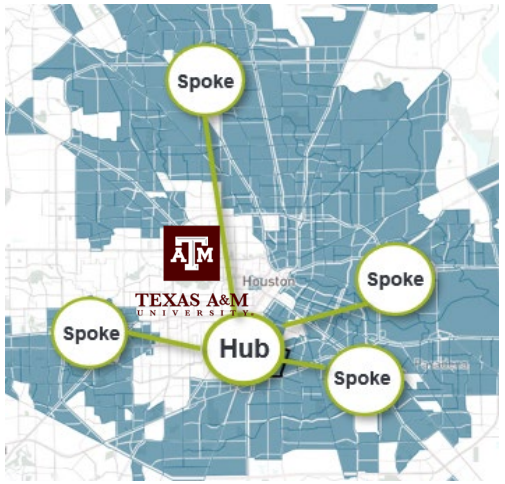
Machine/Process Operator

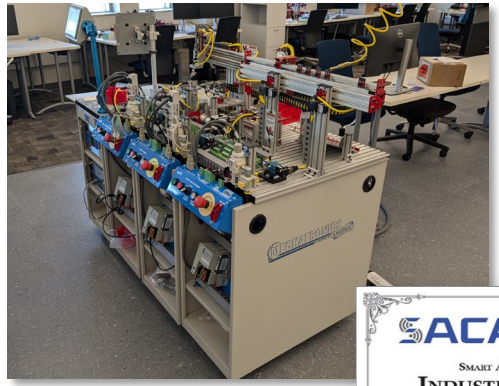
C-104 Associate - IIoT, Networking & Data Analytics
C-103 Associate - Robot System Operations
C-102 Associate - Advanced Operations
C-101 Associate - Basic Operations

SM Instructor Academy

SM Credential Aligned Community College Instructor Academy

- Instructor Academy and Hub for SM Skills in the region
- SACA Certification-Based Courses
- Professors leave with curriculum and exercises
- Hybrid online and in-person
- Smart Factory, SM Learning System, and Digital Twin VR software
- Training Assessment for fast tracking worker learning

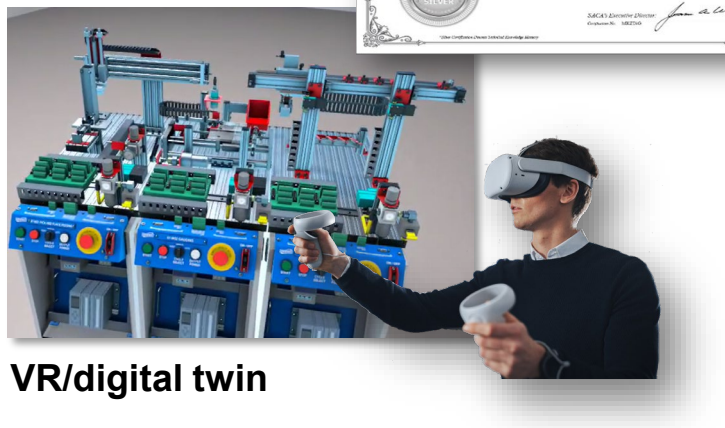




Smart Factory







VR/digital twin

CESMII THE SMART MANUFACTURING INSTITUTE

TEXAS A&M UNIVERSITY

SACA SMART AUTOMATION CERTIFICATION ALLIANCE

AMATROL

Check out these Resources for Your Education Programs



National Micro-credentials to **Guide Curriculum** for SM Education Programs

SACA micro-credentials provide guidance for curriculum, so students and workforce start accumulating industry standards stackable micro-credentials.

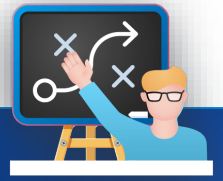
Learn More



Industrial Lab Equipment and **Online Modules** for your Hybrid Education Programs

Accelerate your education program leveraging off-the-shelf online courses, hardware, and software to train the workforce with the latest industry techniques.

Learn More



Train and Equip Instructors to Teach Smart Manufacturing Skills

The Instructor Academy trains and equips instructors to teach SM skills with modules and hands-on exercises aligned to SACA micro-credentials.

Learn More



Join CESMII ecosystem of educators working om SM education

Take advantage of the CESMII-Endorsed SM Education program. Have peers and experts provide guidance for the development of curriculum and hands-on exercises for Smart Manufacturing education.

Learn More

SACA
SMART AUTOMATION CERTIFICATION ALLIANCE

AMATROL
CERTIFIED ISO 9001:2015

TEXAS A&M UNIVERSITY

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CESMII
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EXPANDING THE

Ecosystem to **Support Manufacturers**



conrad.leiva@cesmii.org

www.cesmii.org

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