AI+ Manufacturing Practitioner (5 Days)

Program Detailed Curriculum

AI CERTs®
AI+ Manufacturing Practitioner

Executive Summary

The AI+ Manufacturing Practitioner certification equips professionals to understand and apply artificial intelligence across production, maintenance, quality, supply chain, planning, and automation. Learners explore industrial data, vision AI, predictive maintenance, system architecture, implementation planning, responsible AI, cybersecurity, safety, return on investment, and emerging technologies. The program emphasizes practical decision-making through manufacturing use-cases, industry case studies, guided exercises, and a capstone project. Participants learn to assess AI opportunities, evaluate data and system readiness, design pilots, measure operational value, manage implementation risks, and develop phased roadmaps for scalable, responsible AI adoption in manufacturing environments.

Prerequisites :

- **Manufacturing Operations Awareness:** Familiarity with production, maintenance, quality, and supply chain processes.
- **Fundamental AI Knowledge:** Understanding basic AI and machine learning concepts.
- **Data Literacy:** Ability to interpret operational data, KPIs, and trends.
- **Digital Systems Familiarity:** Exposure to MES, SCADA, ERP, sensors, or industrial platforms.
- **Continuous Improvement Mindset:** Interest in solving operational problems through data and technology.

Module 1

AI in Manufacturing - Context and Opportunities

1.1 AI Fundamentals in Manufacturing

- Understand how AI uses industrial data for prediction, pattern recognition, decision support, and operational optimization beyond basic automation, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Learn the differences between fixed-rule automation and AI systems that learn from data, adapt to changing conditions, and support decisions, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

1.2 AI Across Plant Operations

- Explore how AI supports production monitoring, scheduling, throughput improvement, and bottleneck detection while analyzing equipment condition and maintenance data to predict failures, prioritize work, improve reliability, and enable faster operational decisions using relevant data, methods, operational considerations, and measurable outcomes.
- Learn how AI strengthens inspection, defect detection, quality prediction, and root-cause analysis while improving demand forecasting, inventory planning, supplier visibility, logistics coordination, and production responsiveness across manufacturing processes through practical data, methods, operational considerations, and measurable outcomes.

1.3 Human and Business Context of AI Adoption

- Understand how operators, engineers, and managers combine AI recommendations with process knowledge, human judgment, and accountability, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Learn how AI adoption influences downtime, yield, quality, productivity, planning accuracy, cost, and operational responsiveness, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

1.4 Use-Cases

- Apply a structured approach to identify practical AI opportunities across maintenance, quality, and production operations within a manufacturing plant, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.
- Learn how to compare traditional rule-based automation with AI-enabled decision support across factory workflows, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

1.5 Case Studies

- Explore how Bosch evaluates AI value across maintenance, inspection, and production planning, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.
- Examine how Unilever distinguishes conventional automation from AI-assisted operational improvement in plant operations, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

1.6 Hands-On

- Learn how to conduct an AI opportunity mapping exercise using ChatGPT, Claude, or Perplexity, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 2

Core AI Applications in Manufacturing

2.1 Vision AI in Manufacturing

- Understand how AI uses industrial data for prediction, pattern recognition, decision support, and operational optimization beyond basic automation, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Learn the differences between fixed-rule automation and AI systems that learn from data, adapt to changing conditions, and support decisions, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

2.2 Maintenance and Reliability AI

- Discover how machine and sensor data reveal early degradation patterns, enabling AI to track equipment condition, detect anomalies, estimate failure risks, and support timely predictive maintenance decisions using relevant data, methods, operational considerations, and measurable outcomes.
- Understand how AI improves preventive maintenance intervals, task prioritization, spare-parts planning, and resource allocation, while reliability-centered maintenance aligns asset criticality, failure modes, maintenance strategies, and AI insights with operational priorities in manufacturing environments.

2.3 Operational AI in Manufacturing

- Explore how AI reduces unnecessary maintenance, improves work planning, shortens response times, and increases maintenance productivity, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Examine how AI identifies process settings, bottlenecks, and variation patterns that improve throughput, yield, stability, and scrap control, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

2.4 AI in Planning and Automation

- Discover how AI combines demand patterns, seasonality, and inventory data to improve production planning, stock levels, and replenishment decisions, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Analyze how AI enables robots and automated systems to perceive conditions, adapt tasks, collaborate safely, and respond to production changes, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

2.5 Use-Cases

- Explore how to apply vision-based defect detection on high-precision or high-volume production lines, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.
- Examine how to combine predictive maintenance and process optimization to improve uptime and reduce scrap, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

2.6 Case Studies

- Analyze how BMW Group applies AI vision systems for inspection and defect detection in automotive production, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.
- Understand how Unilever uses AI for demand forecasting and inventory optimization across consumer goods operations, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

2.7 Hands-On Exercise

- Apply a structured approach to build and test a no-code defect detection demonstration using Teachable Machine, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 3

Manufacturing Data and Readiness

3.1 Types of Manufacturing Data

- Understand how machine and sensor data, including vibration, temperature, pressure, current, speed, cycle time, load, runtime, and alarms, combine with inspection results, defect records, test measurements, scrap, rework, and non-conformance data to support industrial AI and quality improvement.

- Explore how work orders, failure notes, repair histories, maintenance actions, technician observations, asset identity, specifications, hierarchy, age, location, criticality, and operating history provide essential context for reliability analysis, model development, and informed AI-driven decisions in manufacturing environments.

3.2 Data Readiness Requirements

- Discover how sufficient, accessible, relevant, and continuously collected plant data determines whether an AI use-case can be supported, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Analyze how accuracy, completeness, consistency, labeling, standardization, and validation influence AI model reliability and operational trust, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Understand how the length, coverage, and representativeness of historical records affect trend analysis, model training, and failure prediction, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

3.3 Common Readiness Challenges

- Learn how missing readings, inconsistent formats, labeling errors, irregular collection, and disconnected machines, MES, SCADA, quality, maintenance, and enterprise systems reduce AI accuracy, restrict data access, and complicate integration across manufacturing environments.

- Explore how incomplete asset registers, work histories, failure codes, and maintenance records limit reliability analytics and predictive maintenance, while examining the data, methods, operational considerations, and measurable outcomes needed to improve maintenance insights and AI performance.

3.4 Use-Cases

- Evaluate how to assess whether available plant data is sufficient for predictive maintenance or quality analytics, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

- Apply a structured approach to identify data gaps and integration issues before starting a manufacturing AI initiative, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

3.5 Case Studies

- Discover how Emerson conducts a data readiness assessment before launching an AI maintenance pilot, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

- Explore how Siemens addresses siloed data across machines, quality systems, and maintenance records in a multi-line environment, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

3.6 Hands-On Exercise: Manufacturing KPI Dashboard Creation using Looker Studio

- Explore how to create a manufacturing KPI dashboard using Looker Studio for data review and readiness assessment, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 4

AI Systems and Architecture in Manufacturing

4.1 Deployment Approaches for Industrial AI

- Discover how latency, connectivity, data volume, security, responsiveness, and scalability influence edge-versus-cloud deployment decisions, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Analyze how decision urgency, data flow, processing timing, storage, and operational impact determine real-time or batch AI processing, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

4.2 AI System Structure

- Understand how manufacturing data moves through preparation, model analysis, decision support, operational action, and feedback loops, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Learn how AI systems connect machines, sensors, databases, applications, and workflows across plant and enterprise platforms, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

4.3 Integration and Solution Evaluation

- Explore how AI exchanges data and decisions with MES, SCADA, and ERP systems through interfaces, pipelines, and operational workflows, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Examine how to compare custom development, commercial products, and vendor-led solutions using cost, fit, integration, support, and scalability, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

4.4 Use-Cases

- Learn how to choose between edge and cloud deployment for machine monitoring or vision inspection, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

- Explore how to evaluate vendor solutions for integration with existing manufacturing systems and workflows, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

4.5 Case Studies

- Examine how BMW Group deploys edge AI for real-time inspection on a production line, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.
- Analyze how Foxconn uses cloud-based analytics to monitor performance across multiple manufacturing facilities, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

4.6 Hands-On Exercise: AI System Architecture Mapping Exercise using Miro or draw.io

- Develop a structured approach to map an industrial AI system architecture using Miro or draw.io, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 5

Implementing AI in Manufacturing

5.1 Identifying and Prioritizing AI Opportunities

- Discover how recurring problems, measurable losses, available data, repetitive analysis, and clear KPIs reveal high-value AI opportunities, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Analyze how business impact, data readiness, complexity, infrastructure, resources, urgency, expected return, asset criticality, failure frequency, downtime cost, safety impact, and data availability guide AI prioritization, using relevant data, methods, operational considerations, and measurable outcomes in manufacturing environments.

5.2 Pilot and Proof-of-Concept Design

- Learn how to define pilot scope, assets, stakeholders, data, timelines, controls, success measures, and operational responsibilities, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Explore how to test technical viability and business relevance through focused objectives, representative data, model evaluation, and stakeholder review, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

5.3 Measuring and Scaling AI Impact

- Examine how OEE, downtime, yield, throughput, scrap, and baseline comparisons measure manufacturing AI performance and operational impact, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Discover how MTBF, MTTR, asset availability, maintenance planning, emergency work, and costs measure reliability improvements, while analyzing how standardization, infrastructure, governance, model monitoring, local adaptation, workforce enablement, and change management support effective multi-plant scaling through relevant data, methods, operational considerations, and measurable outcomes.

5.4 Real-World Implementation Constraints

- Understand how aging equipment, limited connectivity, inconsistent records, missing sensors, and technical debt constrain AI implementation, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Learn how different priorities, responsibilities, technologies, security practices, and communication patterns affect coordination between IT and operational technology teams, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

5.5 Use-Cases

- Examine how to design a focused pilot for predictive maintenance or defect detection on one production line, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

- Evaluate how to scale a successful AI use-case from one plant or line to multiple manufacturing locations, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

5.6 Case Studies

- Understand how Bosch runs a proof-of-concept for downtime reduction before broader rollout, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

- Discover how Schneider Electric addresses legacy systems and IT/OT coordination while scaling an AI initiative, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

5.7 Hands-On Exercise: AI Pilot and Implementation Roadmap Workshop using Miro

- Learn how to build an AI pilot and implementation roadmap using Miro, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 6

Responsible AI, Safety, and Security

6.1 Responsible AI in Industrial Operations

- Explore how clear reasons, supporting signals, confidence, and decision context make AI recommendations understandable to plant teams, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Examine how transparent outputs, traceability, communication, and consistent review build trust in AI-supported operational decisions, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

6.2 Governance and Data Responsibility

- Discover how ownership, access, quality standards, retention, security, lineage, and accountability support responsible industrial data use, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Analyze how approval, documentation, validation, version control, monitoring, ownership, and review manage AI models and outputs, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

6.3 Security and Safety Risks

- Understand how connected machines, sensors, gateways, networks, cloud services, and AI platforms create cybersecurity risks and attack paths, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Learn how AI errors, delayed responses, unsafe commands, sensor faults, and automation interactions affect industrial safety, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

6.4 Human Oversight and Escalation

- Explore how operators, engineers, supervisors, and specialists review, validate, override, and remain accountable for AI-supported decisions, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Examine how thresholds, alerts, approvals, fallback modes, stop controls, audit trails, and escalation paths maintain operational control, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

6.5 Use-Cases

- Apply a structured approach to evaluate whether AI-driven operational recommendations are transparent and explainable to plant teams, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.
- Learn how to identify cybersecurity and safety risks in connected AI-enabled manufacturing environments, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

6.6 Case Studies

- Explore how Siemens establishes governance controls for AI-based quality and maintenance systems, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.
- Examine how Honeywell reviews safety and cybersecurity safeguards before deploying AI-enabled automation, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

6.7 Hands-On Exercise: AI Risk and Governance Checklist Exercise using Google Sheets

- Apply a structured approach to create and apply an AI risk and governance checklist using Google Sheets, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 7

AI Success, Failure, and ROI

7.1 AI Project Failures in Manufacturing

- Discover how missing, inaccurate, inconsistent, noisy, or poorly labeled data reduces model reliability, insight quality, and user trust, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Analyze how disconnected systems, incompatible formats, delayed pipelines, legacy equipment, complex interfaces, weak stakeholder alignment, unclear value, limited training, poor usability, and low operational ownership obstruct manufacturing AI deployment, while understanding the data, methods, operational considerations, and measurable outcomes needed for effective adoption.

7.2 Success Patterns in AI Adoption

- Learn how leadership support, quality data, cross-functional teams, focused use-cases, measurable KPIs, and user involvement enable AI success, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Explore how alignment with plant priorities, workflows, responsibilities, baselines, and measurable outcomes strengthens AI implementation and adoption, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

7.3 ROI Frameworks for Manufacturing AI

- Examine how implementation, integration, infrastructure, training, maintenance, and operating costs compare with financial and operational benefits, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Discover how improvements in throughput, yield, quality, labor productivity, planning, energy use, and responsiveness create operational value, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Analyze how reduced failures, shorter repairs, improved availability, planned work, and extended asset life contribute to AI value, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

7.4 Industry Comparison

- Understand how automotive, electronics, and FMCG manufacturers differ in AI use-cases, data conditions, adoption barriers, and value drivers, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

7.5 Use-Cases

- Explore how to evaluate AI return on investment in predictive maintenance, quality inspection, or planning functions, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.
- Examine how to compare AI adoption patterns and implementation barriers across different manufacturing sectors, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

7.6 Case Studies

- Analyze how a leading automotive OEM faces AI project challenges caused by weak data quality and poor user adoption, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

- Understand how Unilever achieves measurable forecasting and operational efficiency gains through successful AI deployment, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

7.7 Hands-On Exercise: AI ROI Estimation and Benefit Tracking

- Explore how to estimate ROI and track AI benefits using Google Sheets or Looker Studio, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 8

Future Trends in Manufacturing AI

8.1 Emerging AI Directions in Manufacturing

- Learn how AI enables robots to perceive conditions, learn patterns, adapt tasks, make decisions, and collaborate with people, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Explore how connected AI systems coordinate production, resources, quality, maintenance, and process adjustments with reduced manual intervention, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

8.2 Digital Twins and Intelligent Monitoring

- Examine how virtual replicas of assets, lines, and processes support simulation, monitoring, prediction, testing, and operational improvement, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Analyze how health indicators, utilization, reliability, efficiency, maintenance history, and risk trends provide a complete view of asset performance, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

8.3 Generative AI in Manufacturing

- Understand how generative AI creates, summarizes, retrieves, and explains information for engineering, maintenance, quality, planning, and operations, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

- Learn how generative AI supports troubleshooting, work instructions, maintenance knowledge, document search, training, reporting, and decision preparation, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

8.4 Future Adoption Outlook

- Explore how manufacturing AI capabilities, infrastructure, workforce skills, robotics, digital twins, and generative AI may mature over three to five years, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.
- Examine how phased investments, capability building, data foundations, governance, pilots, scaling, and workforce development support future AI maturity, including the data, methods, operational considerations, and measurable outcomes that help teams apply the concept effectively in manufacturing environments.

8.5 Use-Cases

- Evaluate how to build a phased roadmap for AI, robotics, and digital twin adoption, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.
- Apply a structured approach to evaluate generative AI for maintenance knowledge, process support, and operational decision-making, connecting the operational problem with data needs, AI capabilities, feasibility considerations, stakeholder responsibilities, and measurable outcomes for a realistic manufacturing implementation.

8.6 Case Studies

- Discover how Schneider Electric develops a multi-year roadmap from analytics to AI-enabled autonomous operations, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.
- Explore how KUKA combines robotics, digital twins, and AI-driven decision support to strengthen manufacturing competitiveness, identifying implementation choices, operational challenges, lessons learned, and transferable practices that support effective manufacturing AI planning, adoption, and scale.

8.7 Hands-On: AI Adoption Roadmap Creation

- Develop a structured approach to create a phased manufacturing AI adoption roadmap using Miro, applying a guided workflow to organize inputs, interpret outputs, and create a practical deliverable that supports manufacturing AI decisions and implementation planning.

Module 9

Capstone Project

9.1 Problem Definition and Scope

- Develop a structured approach to frame a manufacturing challenge with clear operational pain points, affected stakeholders, measurable outcomes, and business relevance, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.
- Apply a structured approach to define project boundaries, assumptions, constraints, dependencies, assets, processes, timelines, and expected outcomes, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

9.2 AI Use-Case Selection and Readiness Review

- Evaluate how to identify and prioritize AI use-cases based on operational value, feasibility, strategic alignment, and stakeholder validation, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

- Create a structured approach to assess data availability, quality, completeness, integration, infrastructure, and system capability for the selected use-case, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

9.3 Solution Evaluation and Roadmap Development

- Analyze how to compare AI solution options using feasibility, value, complexity, cost, integration needs, risks, and implementation fit, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

- Develop a structured approach to structure pilot, expansion, and rollout phases with milestones, KPIs, dependencies, responsibilities, controls, and review points, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

9.4 Business Value and Communication

- Apply a structured approach to quantify and communicate expected improvements in downtime, quality, throughput, cost, productivity, reliability, and scalability, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

9.5 Capstone Tracks

- Evaluate how to design an automotive capstone focused on predictive maintenance or robotics using relevant data, KPIs, and implementation steps, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.

- Analyze how to design an FMCG capstone focused on demand forecasting or optimization using operational data, planning metrics, and rollout considerations, then translate the analysis into a structured, evidence-based capstone deliverable that supports stakeholder review and practical manufacturing AI implementation.