

## Learning Outcomes for Digital Manufacturing Leadership Course

	<b>Module Overview</b>	<b>Learning Outcomes</b>
Module 1: Introduction to Digital Manufacturing	<ul style="list-style-type: none"> <li>• Terminology and language</li> <li>• Framing digital manufacturing</li> <li>• How to shape vision</li> <li>• Defining strategy</li> <li>• Understanding your capabilities</li> <li>• Executing initiatives</li> <li>• Resources for smaller manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>• Define digital manufacturing in terms of relevant business value</li> <li>• Describe the importance of a digital manufacturing ecosystem</li> <li>• Name at least one assessment methodology available to map current capabilities and develop digital manufacturing roadmaps</li> <li>• List operational areas of improvement that can drive quantifiable financial returns</li> <li>• Identify digital manufacturing resources available to small-to-medium size manufacturers</li> </ul>
Module 2: Business Benefit and the Business Case	<ul style="list-style-type: none"> <li>• The challenge of transformation</li> <li>• Technical elements</li> <li>• Developing a digital capability strategy</li> <li>• Defined outcomes</li> <li>• Applications</li> <li>• Examples of digital manufacturing strategies</li> <li>• Human capability transformation</li> </ul>	<ul style="list-style-type: none"> <li>• Learn to assess your organization's readiness for digital transformation</li> <li>• Create the foundations of your digital transformation strategy</li> <li>• Learn how to formulate an execution team</li> <li>• Understand how culture and organization will be impacted</li> <li>• Identify gaps in knowledge and planning</li> <li>• Grasp the importance of effective partners when implementing digital transformation</li> </ul>
Module 3: Applying Advanced Reliability Methods	<ul style="list-style-type: none"> <li>• A framework of the asset management business opportunity</li> <li>• A clear definition of an asset and asset management</li> <li>• A high-level discussion of machine condition monitoring</li> <li>• Common conventions in asset management</li> <li>• Potential for using machine learning and artificial</li> </ul>	<ul style="list-style-type: none"> <li>• The importance of a reliability strategy based on criticality</li> <li>• How to assess the strengths and weaknesses of your current MRO program</li> <li>• The importance and impact of master data, data quality, and governance</li> <li>• The necessity of domain expertise to take advantage of advanced</li> </ul>

	<p>intelligence models in asset management</p> <ul style="list-style-type: none"> <li>• Examples of models and methods</li> <li>• Collaborative opportunities with academia</li> </ul>	<p>technologies and build models for critical assets</p>
<p>Module 4:          Digital Supply Chain: Ability to Forecast</p>	<ul style="list-style-type: none"> <li>• Defining and understanding supply chains</li> <li>• Tracking in supply chains</li> <li>• Traceability in supply chains</li> <li>• Automation in supply chains</li> <li>• Data quality and data governance</li> <li>• Performance evaluation</li> <li>• Blockchain technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the current level of digitization of your supply chain</li> <li>• Understand the level of your current track-and-trace capabilities within that supply chain</li> <li>• Become familiar with the technologies that will enhance visibility in your supply chain</li> <li>• Understand your specific use case for implementing an IIoT solution within your organization</li> </ul>
<p>Module 5:          Architecture of a Connected System and Cybersecurity</p>	<ul style="list-style-type: none"> <li>• Automation Stack’s Six Layers</li> <li>• Automation Stack Alignment to the Shop Floor Levels</li> <li>• Legacy Devices into IoT</li> <li>• How MQTT Works</li> <li>• IIoT Communication Protocols – Bench Marking</li> <li>• Traditional Automation Stack Security Model</li> <li>• Proposed IIoT Model</li> </ul>	<ul style="list-style-type: none"> <li>• How to define the Legacy Industrial Automation Stack</li> <li>• What the components are of the IIoT Digital Transformation</li> <li>• How to secure the New IIoT 4.0 framework</li> </ul>
<p>Module 6:          Organizational Change Management</p>	<ul style="list-style-type: none"> <li>• The ADKAR Change Management Model</li> <li>• Why is change so difficult?</li> <li>• Communications &amp; how people respond to change</li> <li>• Adaptive leadership</li> <li>• Role of sponsors &amp; change management coalitions</li> <li>• Building a culture of change</li> </ul>	<ul style="list-style-type: none"> <li>• Understand catalysts and barriers to change and their impact on industry</li> <li>• Recognize need for change and identify necessary steps to lead a diverse team through a successful transition</li> <li>• Implement and sustain change according to the Prosci ADKAR Model</li> <li>• Demonstrate an understanding of how people typically respond to change</li> </ul>

		<ul style="list-style-type: none"> <li>• Create a culture where change can thrive by using adaptive change leadership techniques</li> <li>• Identify the criteria for building an effective change management team</li> </ul>
<p>Module 7:          Private Cellular Networks for Industry 4.0</p>	<ul style="list-style-type: none"> <li>• Terminology and the Language of Private Cellular Networks</li> <li>• Understanding the evolution of Private Cellular Networks from Public Cellular Networks and IoT</li> <li>• Manufacturing and the evolution to Industry 4.0</li> <li>• The intersection of Industry 4.0 with Private Cellular Technologies</li> <li>• WiFi v. Private Cellular Networks – Competitive or Complimentary Technologies?</li> <li>• PCN 4G / PCN 5G – Why Now?</li> <li>• Public / Private Hybrid Networks</li> </ul>	<ul style="list-style-type: none"> <li>• What industry and market trends are driving Private Cellular Networks</li> <li>• What are WiFi challenges that opens the door to Private Cellular Networks</li> <li>• What Industry 4.0 Use Cases are being enabled with Private Cellular Networks</li> <li>• Public / Private Hybrid Networks – Seamless Connectivity of Manufacturing, Warehousing and Distribution Centers</li> <li>• Sourcing Private Cellular Networks from traditional telecom providers (i.e.: Ericsson, Nokia, etc) vs. traditional WiFi providers (i.e.: Cisco, etc) vs. new entrants (i.e.: Celona, etc)</li> <li>• Managing and Operating Private Cellular Networks: Internal IT/OT team, Cellular Service Providers, System Integrators?</li> </ul>
<p>Module 8:          IoT Operations and Governance</p>	<ul style="list-style-type: none"> <li>• Understanding the data that is generated from IoT with respect to:             <ul style="list-style-type: none"> <li>• Standards</li> <li>• Ethics</li> <li>• Risk Management</li> <li>• Governance</li> <li>• Security</li> <li>• Data Management</li> </ul> </li> <li>• Understanding IoT Operations with respect to:</li> </ul>	<ul style="list-style-type: none"> <li>• What are your organization’s current business strategies?</li> <li>• How do the business strategies translate to manufacturing goals?</li> <li>• What problems need to be solved to meet these manufacturing goals?</li> <li>• What kind of data do you currently collect in your organization?</li> <li>• How secure and trustworthy is my data?</li> </ul>

	<ul style="list-style-type: none"> <li>Identifying common data sources</li> <li>Understanding what data is important</li> <li>Using IoT data for Predictive Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>What is your organization's cybersecurity policy?</li> <li>What are my organization's current data governance policies?</li> </ul>
Module 9: IoT Enabled Analysis and Actions	<ul style="list-style-type: none"> <li>Value in industrial analytics and identifying the analytics categories</li> <li>Considerations for industrial analytics and types of analytics</li> <li>Basic overview and a use case of machine learning</li> <li>Change needed in data driven humans and machines</li> <li>Mobility and awareness, analytic model feedback for continuous learning, knowledge management, human augmentation, and data visualization</li> </ul>	<ul style="list-style-type: none"> <li>Weigh focused data considerations for your organization's data to be more useful</li> <li>Recognize location considerations to best perform data analytics</li> <li>Learn ways to use data visualization to add value to your organization.</li> <li>Know actions to take based on an alert</li> </ul>
Module 10: Decision Making and Implementation Strategy	<ul style="list-style-type: none"> <li>Strategies for creating and prioritizing an advanced manufacturing project portfolio, including classifying and selecting projects</li> <li>Managing an improvement portfolio</li> <li>Effective decision making and decision-making tools</li> <li>Generating a portfolio of five viable projects for your organization</li> </ul>	<ul style="list-style-type: none"> <li>Understand the evaluation of proposed improvement projects</li> <li>Define the framework of your acceptance criteria</li> <li>Create a common project ranking system</li> <li>Identify your top five viable improvement projects</li> </ul>
Final Capstone Presentation	<ul style="list-style-type: none"> <li>The capstone presentation asks you to develop an actionable plan with clear steps for your organization</li> <li>Deliver a 10-minute presentation that consists of</li> </ul>	<ul style="list-style-type: none"> <li>Succinctly present and explain the solution in the allotted time and space to convey that you fully understand these aspects of your organization's transformation plan</li> </ul>

	<p>a summary solution of your plan</p> <ul style="list-style-type: none"><li>• Your presentation should cover your objective, actions, requirements, gaps, and expected return</li></ul>	
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To register for the Digital Manufacturing Leadership course: <https://uwm.edu/csi/dml/>  
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