Industrial Internet of Things (IIoT): MQTT Protocol

10hr Course | Earn an ASU Micro-badge

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What is the Industrial Internet of Things?

Over the last decade, data has been recognized as a significant asset in every major industrial sector. There is a tremendous potential for utilizing data in improving manufacturing productivity and enabling a digitalized transformation of the factory floor, all leading to the Smart Manufacturing Environment. This course covers the Smart Manufacturing definition, characteristics and principles. An overview of the Industrial Internet of things software stack, and a specific focus on the MQTT protocol and how this specific technology enables the Digital Twin.

When and where is the program being offered?

This is an open enrollment class that will be offered on the ZOOM/ASU Polytechnic Campus starting Feb 24th, 2023 and will be offered successively through June 30th, 2023. The 10hr module class will meet over 3 days (Friday, Saturday and Sunday). You do not need to be an ASU student to take this class.

What do I need to know to take this class?

The content of the class is designed in such a way that any student or working professional in science, engineering and math will be able to take this class. High-School math is all that is needed to be able to take the content of this class. Students are not required to write computer code for this class.

How do I make sure to earn the Micro-Badge for this class?

To earn the micro badge, the student must attend all 10hrs of the class, including lab-based assignments, complete at home reading assignments and a final assessment that is provided at the end of the class. This class does not qualify for credit transfer requirements.

Will more courses be offered related to the Industrial Internet of Things Certification Badge?

This course is part of the Industrial Internet of Things (IIoT): Information Technology/Operations Technology (IT/OT) Integration. New 10hr modules will be offered that enables a student to continuously stack up micro-badge certifications. Please contact instructor for more details.

How much does the program cost?

The cost of the program for those who meet AZ residency requirements is free. This cost will cover the program fee, and any materials required to successfully perform laboratory assignments. The class will be filled on a first come, first-serve basis with any additional students being put on a waitlist until seats are available.

What is covered in this 10-hour Class Module?

This ten-hour module introduces the student to the industrial internet of things terminology, hardware and software components and vendors and the Publish-Subscribe Based MQTT Protocol for machine-to-machine communications. This 10-hour module offers a lecture and hands-on laboratory training in machine-2-machine communication protocol that is critical to smart factory operations.

Competencies	Description
1) Intro to IIoT and Smart manufacturing	History of the Industrial Revolution, The Digitization of Manufacturing, Smart Manufacturing Definitions, standards, and terminology.
2) Machine-2-Machine Communication Methodologies	Client-Server Communication and Publish-Subscribe Based Communication in Smart Factories
3) Industrial Internet Communication	Types of cables used in Industrial Internet Environments; Hardware used in Smart Factory Floors.
4) MQTT Type Communication in Factories	MQTT based publish-subscribe communication in an industrial environment; Characteristics of MQTT; Implementation Studies
	Laboratory: Students will initiate an MQTT communication between two endpoints via their own personal laptop or a virtual machine in the cloud.
5) Applications of MQTT in an Industrial Setting	Discuss the various applications of MQTT in a factory production within the context of a job-shop.
	Laboratory: Design MQTT data payload that will help build dashboards that assist a machine operator and a production supervisor.
6) Case Study for a Small Manufacturing Company	Student will complete a case study involving a small manufacturing-based job-shop, while taking into account their specific constraints and requirements.
Assessment Test	

How do I earn a Full Badge in IIoT: IT/OT Integration?

The following courses can be taken by the students to earn a full badge in IIoT. Details regarding availability will be made available shortly.

1) Industrial Internet of Things: MQTT Protocol (*This Course*)
2) Industrial Internet of Things: Architectural Stack with Python & MQTT
3) Industrial Internet of Things: Implementation with Raspberry PI + Plotly Dash
4) Industrial Internet of Things: Image Processing for Machine Vision
5) Industrial Internet of Things: IIoT Stack with Cloud Computing

Can I display this micro-badge on my LinkedIn profile?

Yes, students are allowed to display the micro-badge attainment on the student's profile. Instructions will be provided to participants on how to do this integration. In addition, any prospective employer can review the content learned as part of the micro-badge attainment.