

20ES009 - Industrial Internet of Things

UNIT – I

Introduction to the Industrial Internet - What is IIoT, Key IIoT Technologies Catalysts and Precursors of the IIoT, Innovation and the IIoT, Key Opportunities and Benefits, The Digital and Human Workforce

Industrial Internet Use-Cases - Healthcare, Oil and Gas Industry, Smart Office, Logistics and the Industrial Internet, Retail

The Technical and Business Innovators of the Industrial Internet – Miniaturization, Cyber Physical Systems (CPS), Wireless Technology, IP Mobility, Network Functionality Virtualization (NFV), Network Virtualization, The Cloud and Fog, Big Data and Analytics, M2M Learning and Artificial Intelligence, Augmented Reality, 3D Printing, People versus Automation

UNIT – II

IIoT Reference Architecture - The IIC Industrial Internet Reference Architecture, Industrial Internet Architecture Framework (IIAF), Architectural Topology, The Three-Tier Topology, Connectivity, Key System Characteristics, Data Management.

Designing Industrial Internet Systems - The Concept of the IIoT, The Proximity Network, WSN Edge Node, Legacy Industrial Protocols, Modern Communication Protocols, Wireless Communication Technologies, Proximity Network Communication Protocols, Gateways

Examining the Access Network Technology and Protocols - The Access Network, Access Networks Connecting Remote Edge Networks

UNIT – III

Examining the Middleware Transport Protocols - TCP/IP, UDP, Reliable Transport Protocol (RTP), CoAP (Constrained Application Protocol)

Middleware Software Patterns - Publish/Subscribe Pattern: MQTT, XMPP, AMQP, DDS, Delay Tolerant Networks (DTN)

Software Design Concepts – API (Application Programming Interface), API: A Technical Perspective, Web Services

Middleware Industrial Internet of Things Platforms: Middleware Architecture, necessity of IIoT Middleware Platforms

UNIT - IV

IIoT WAN Technologies and Protocols - IIoT Device Low-Power WAN Optimized Technologies for M2M :SigFox, LoRaWAN, Low Power Wi-Fi, LTE Category-M, Weightless

Securing the Industrial Internet - Security in Manufacturing: PLCs and DCS, Securing the OT, Network Level: Potential Security Issues, System Level: Potential Security Issues, Identity Access Management

UNIT-V

Introducing Industry 4.0: Defining Industry 4.0, Four Main Characteristics of Industry 4.0, The Value Chain, Industry 4.0 Design Principles, Building Blocks of Industry 4.0, Smart Manufacturing

Smart Factories: Introducing the Smart Factory, Smart Factories in Action, Importance of Smart Manufacturing, Real-World Smart Factories - GE's Brilliant Factory, Airbus: Smart Tools and Smart Apps, Siemens' Amberg Electronics Plant (EWA), Industry 4.0: The Way Forward

TEXTBOOKS:

1. Alasdair Gilchrist, "Industry 4.0: The Industrial Internet of Things" by, ISBN: 978-1-4842-2046-7, APRESS, 2016.
2. Vijay Madiseti, ArshdeepBahga, "Internet of Things A Hands-On- Approach", 2014

REFERENCE BOOKS:

1. Giacomo Veneri; Antonio Capasso, "Hands-on Industrial Internet of Things : create a powerful Industrial IoT infrastructure using Industry 4.0", ,Packt Publishing, 2018
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013