GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering (Part Time)
Subject Code: 2971910

Semester – VII
Subject Name: Industrial Internet of Things

Type of course: Professional Elective

Prerequisite: Nil

Rationale:
IoT will change industries and transform the way we work and live. Industrial companies are already pivoting from Products to Services leveraging IoT technologies – this digital transformation is more broadly called the Industrial IoT or Industrial Internet. The objective of this subject is make students aware about this latest technology, its application and to identify future scope for better manufacturing system.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
03	0	00	03	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	**Understanding Industrial Internet of Things (IIoT):** Industrial Internet of Things and Cyber Manufacturing Systems, Application map for Industrial Cyber Physical Systems, Cyber Physical Electronics production.	08
2	**Modeling of CPS and CMS:** Modeling of Cyber Physical Engineering and manufacturing, Model based engineering of supervisory controllers for cyber physical systems, formal verification of system, components, Evaluation model for assessments of cyber physical production systems.	10
3	**Architectural Design Patterns for CMS and IIoT:** CPS-based manufacturing and Industries 4.0., Integration of Knowledge base data base and machine vision, Interoperability in Smart Automation, Enhancing Resiliency in Production Facilities through CPS. Communication and Networking of IIoT.	08
4	**Artificial Intelligence and Data Analytics for manufacturing:** Application of CPS in Machine tools, Digital production, Cyber Physical system Intelligence, Introduction to big data and machine learning and condition Monitoring.	06

5	**Evaluation of Workforce and Human Machine Interaction:** Worker and CPS, Strategies to support user intervention. Introduction to Advance manufacturing and Innovation Ecosystems.	**06**
6	**Application of IIoT:** Smart Metering, e-Health Body Area Networks, City Automation, Automotive Applications, Home Automation, Smart Cards, Plant Automation, Real life examples of IIOT in Manufacturing Sector.	**07**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**20**	**0**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Sabina Jeschke, Christian Brecher Houbing Song , Danda B. Rawat Editors Industrial Internet of Things Cyber Manufacturing Systems
2. Hakima Chaouchi, " The Internet of Things Connecting Objects to the Web" ISBN : 978-1- 84821-140-7, Willy Publications Olivier Hersent, David Boswarthick, Omar Elloumi,
3. The Internet of Things: Key Applications and Protocols, ISBN: 978-1-119-99435-0, 2nd Edition, Willy Publications
4. Inside the Internet of Things (IoT), Deloitte University Press
5. Internet of Things- From Research and Innovation to Market Deployment; By Ovidiu & Peter; River Publishers Series
6. Five thoughts from the Father of the Internet of Things; by Phil Wainewright - Kevin Ashton
7. How Protocol Conversion Addresses IIoT Challenges: White Paper By RedLion.
8. Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies Sensors for the Internet of Things Businesses & Market Trends 2014 -2024',Yole Development Copyrights ,2014

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Describe Industrial Internet of Things and Cyber Physical manufacturing	15
CO-2	Demonstrate Cyber Physical and Cyber Manufacturing systems	20

CO-3	Describe Architectural design patterns for industrial Internet of Things	20
CO-4	Analyse AI and data Analytics for Industrial Internet of Things	20
CO-5	Evaluation of Workforce and Human Machine Interaction and Application of Industrial Internet of Things	25