FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: BACHELOR OF TECHNOLOGY (Electronics and Communication)

Semester: VIII

Course Code: 202060804

Course Title: Applications of Industrial IoT

Course Group: Professional Elective Course

Course Objectives: Industrial IoT is fueling the next industrial revolution of intelligent connectivity by bringing digital transformation to the traditional way of doing business in order to improve efficiency and reduce downtime. New-age technologies present promising career opportunities now and in the foreseeable future. For the business to be competitive and ready to take on the challenges of the future, this is the perfect time for students to acquire the skills in IIoT technology for professional growth.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		
Lecture	Tutorial	Practical		Internal	External	Internal	External	Total
3	0	2	4	50/18	50/17	25/9	25/9	150/53

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction:** Globalization, The Fourth Revolution, LEAN Production Systems; Industry 4.0: Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis.	6
2	**Basics of Industrial IoT:** Industrial Processes-Part I, Part II, Industrial Sensing & Actuation; IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models-Part I, Part II, IIoT Reference Architecture-Part I, Part II; Industrial IoT- Layers: IIoT Sensing-Part I, Part II, IIoT Processing-Part I, Part II, IIoT Communication-Part I	12

3	**Industrial IoT- Big Data Analytics and Software Defined Networks:** IIoT Analytics - Introduction, Machine Learning and Data Science Part I, Part Il; Industrial IoT: Big Data Analytics and Software Defined Networks: SDN in IIoT-Part I, Part II, Data Center Networks, Industrial IoT	12
4	**Industrial IoT Security:** Fog Computing in IIoT, Security in IIoT-Part I, Part II, Industrial IoT- Application Domains; Industrial IoT- Application Domains: Healthcare, Power Plants, Inventory Management & Quality Control, Plant Safety and Security (Including AR and VR safety applications), Facility Management.	8
5	**Industrial IoT-** Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Real case studies.	7
		45

List of Practicals / Tutorials:

1	Smart Home Assistant with cloud integration
2	Intelligent and Weather Adaptive Street Lighting system
3	Development of Agricultural IoT Gateway
4	Connected Agri Warehouses cloud enabled infrastructure
5	Soldier health & Position tracking system with LORA Communication
6	e-health monitoring system for remote patient health monitoring
7	Smart Biometric Attendance System with Raspberry Pi
8	Cloud integrated smart attendance system
9	Automatic Vehicle Accident Alert System using AWS IoT.
10	Design and implement a RFID based smart attendance system.
11	Design and implement a smart liquid level monitoring system.

Reference Books:

1	Sudip Misra, Chandana Roy and Anandarup Mukherjee, **Introduction to Industrial Internet of Things and Industry 4.0**, CRC Press.
2	G Veneri Antonio, **Hands-on Industrial Internet of Things**, Packt Publication
3	Alasdair Gilchrist , **Industry 4.0: The Industrial Internet of Things**, Apress.
4	Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat, **Industrial Internet of Things: Cyber manufacturing Systems,** Springer.

Supplementary learning Material:

1	Introduction to Industry 4.0 and Industrial Internet of Things - Course (nptel.ac.in
2	https://onlinecourses.nptel.ac.in/noc21_cs63/preview

Pedagogy:
- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz

Opp. Shastri Maidan, Beside BVM College, Vallabh Vidyanagar, Dist: Anand, Gujarat - 388120

(O): 02692-238001 | Email: adminoffice@cvmu.edu.in | www.cvmu.edu.in

- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	30	15	15	10	10	

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.

Course Outcomes (CO):

After learning the course the students should be able to:

Sr.	Course Outcome Statements	%weightage
CO-1	To study sensing and actuation in industries.	25
CO-2	To understand the basics of industrial IoT (IIoT).	25
CO-3	To apply Big data analytics and Software defined networks in IIoT.	25
CO-4	To study IIoT security and various IIoT application domains.	25

Curriculum Revision:	
Version:	**2.0**
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June 2025