

INDUSTRY 4.0 and IIoT

CourseCode	20ME5602	Year	III	Semester	II
Course Category	Minor in DM	Branch	ME	Course Type	Theory
Credits	4	L – T – P	3 – 1 – 0	Prerequisites	Basic Manufacturing Processes
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	Skill	BTL	Units
CO1	Illustrate how Industry 4.0 will change the current manufacturing technologies and processes by digitizing the value chain	Understand Communication	L2	1,2
CO2	Discuss the drivers and enablers of Industry 4.0	Apply, Communication	L2	3
CO3	Apply various IIoT-related protocols	Apply, Communication	L2	4
CO4	Explain simple IIoT Systems using Arduino and Raspberry Pi	Apply, Communication	L2	5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		1		2							2		
CO2	3		1		2							2		
CO3	3		1		2							2		
CO4	3		1		2							2		

Syllabus

UNIT	Contents	Mapped COs
I	Introduction to Industry 4.0: Industry 4.0: Globalization and Emerging Issues, The Fourth Revolution, LEAN Production Systems, Mass Customization, Smart and Connected Business Perspective, Smart Factories	CO1
II	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.	CO1
III	Introduction to IIoT: Architectural Overview, Design principles and needed capabilities, IoT Applications, Sensing, Actuation, Basics of Networking, M2M and IoT Technology Fundamentals- Devices and gateways, Data management, Business processes in IoT, Everything as a Service (XaaS), Role of Cloud in IoT, Security aspects in IoT	CO2
IV	Elements of IIoT: Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing, Actuation, I/O interfaces. Software Components- Programming API's (using Python/Node.js/Arduino) for Communication	CO 3

	Protocols-MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP.	
V	IIoT Application Development: Solution framework for IoT applications- Implementation of Device integration, Data acquisition and integration, Device data storage- Unstructured data storage on cloud/local server, Authentication, authorization of devices. Case Studies: IoT case studies and mini projects based on Industrial automation, Transportation, Agriculture, Healthcare, Home Automation	CO4

Learning Resources

Text books
<ol style="list-style-type: none"> 1.Introduction to Industrial Internet of Things and Industry 4.0, Sudip Misra, Chandana Roy, Anandarup Mukherjee, CRC Press, 2020. 2. A Hands on Approach”, Vijay Madiseti, Arshdeep Bahga, ĩnternet of Things, University Press, 2009. 3. Introduction to Internet of Things: A practical Approach”, Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, ETI Labs,2010
Reference books
<ol style="list-style-type: none"> 1.Internet of Things: Architecture and Design, Raj Kamal, McGraw Hill., 2005. 2.Getting Started with the Internet of Things, Cuno Pfister, O Reilly Media, 2007
E- Resources & other digital material
1. https://onlinecourses.nptel.ac.in/noc21_cs17/preview