



# GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering Syllabus

Subject Code : ME02000031

Subject Name : IOT and Applications

WEF Academic Year:	2024-25
Semester:	2
Category of the Course :	PEC-3

**Prerequisite** Fundamentals of computer networking

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<b>Rationale :</b>	IoT market is growing rapidly from installed base of about 10 billion devices in the year 2018 and expected to 20 billion devices by 2020 for Consumer and business/industry. Industry 4.0 is based on IoT. This subject will provide opportunity to the students for contribution in IoT applications.
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**Course Scheme :**

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Course Content :**

Sr. No.	Course Content	No. of Hours	% of Weightage
1.	Internet of Things and Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.	6	12



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2.	M2M to IoT - A Basic Perspective- Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview- Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations	7	18
3.	IoT Architecture -State of the Art - Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.	8	12
4.	IoT Applications for Value Creations, IoT applications for industry (Industry 4.0: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.	5	10
5.	Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues,	6	12
6.	IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, SMARTIE Approach. Data Aggregation for the IoT in Smart Cities	4	10
<b>Total</b>			<b>100</b>

## Reference Book :

[1] Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", , Paperback, 2015.

[2] Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1stEdition, Apress Publications, 2013.

[3] A. McEwen, H. Cassimally, "Designing the Internet of Things", Wiley, 2013.

[4] CunoPfister, "Getting Started with the Internet of Things", O\_Reilly Media, 2011.

[5] Yashwant Kanetkar, "21 Internet of Things Experiments", Kindle edition

## Course Outcome :

After Completion of the Course, Student will able to :



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No	Course Outcomes	RBT Level*
01	Understand the concept of IOT and M2M	UN
02	Design applications based on IOT Architecture	CR
03	Evaluate security and privacy issues in IoT	EL
04	To apply data aggregation for IoT in smart cities	AP

\*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

### Suggested Course Practical List :

1. Experiments based on IoT protocols such as MQTT
2. Experiments based on Security algorithms
3. Uploading sensor data on cloud
4. Web based device control
5. Agriculture IoT applications (Soil moisture, PH monitor)
6. IoT based home automation
7. Smart energy experiments
8. Smart city IoT applications

### List of Laboratory/Learning Resources Required :

1. NPTEL online course on IoT: [https://onlinecourses.nptel.ac.in/noc18\\_cs08](https://onlinecourses.nptel.ac.in/noc18_cs08)
2. IoT Tutorial point [www.tutorialspoint.com](http://www.tutorialspoint.com)
3. <https://www.microsoft.com/en-us/internet-of-things>