GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code : 3164206

Subject Name : Internet of Things

WEF Academic Year :	2020-21
Semester :	6
Category of the Course :	Professional Elective

Prerequisite :

Computer networks, Basics of Microcontroller and Processors, Fundamentals of sensors.

Rationale :

- The Internet of Things (IoT) has emerging requirements with different ways of working and industry 4.0 based on IoT only.
- IoT is useful in many sectors like consumer, commercial, infrastructure, health, industry and military.
- It is required to impart basic understanding and implementation of various requirements of the IoT.

Course Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
03	00	02	04	70	30	30	20	150

Course Content :

Sr No	Course Content	No. of Hours	% of Weightage
1	**Unit I: Introduction to IOT:** Genesis of IOT, IOT and digitization, IOT impact, Convergence of IT and IOT, IOT challenges.	04	10
2	**Unit-II: IOT Network Architecture and Design:** Drivers behind new Network Architecture, Comparing IOT architectures, Simplified IOT architecture, Core of IOT functional stack, IOT data management and compute stack.	08	20
3	**Unit-III: Engineering IOT Networks:** Sensors, Actuators, Smart Objects, Wireless Sensor Networks and protocols for Wireless Sensor Networks.	06	15
4	**Unit-IV: Connecting Smart Objects:** Standardization, Range, Topology, Frequency bands, Power Consumption, Constrained Devices, Constrained Node Networks, Data Range, Throughput, Latency, Determinism, Overbead and Payload, IoT access technologies, Various competitive technologies,	06	15

5	**Unit-V: IP as IOT Network Layer:** Business Case for IP, Need for Optimization, Optimizing IP for IOT, Profiles and compliances, Security in IoT	08	20
6	**Unit VI: Application Protocols for IOT:** Transport Layer, IOT Application Transport Methods: SCADA and MQTT, Introduction to data analytics for IoT, Machine learning, Edge streaming analytics.	08	20

Reference Book :

[1] David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton, Jerome Henry, "IOT Fundamentals: Networking Technologies, Protocols and Cases for the Internet of Things", cisco press
[2] Rahul Dubey, "An Introduction to Internet of Things: Connecting Devices, Edge Gateway, and Cloud with Applications", Cengage India Publication
[3] Raj Kamal, "Internet of Things: Architecture and Design Principles, Mc Graw Hill Education [3] Hanes et al "IoT Fundamentals", Cisco Press
[4] A. McEwen, H. Cassimally, "Designing the Internet of Things", Wiley, 2013.
[5] Adeel Javed, "Building Arduino projects for Internet of Things", Apress publication
[6] Donald Noris, "The Internet of Things: Do it yourself Projects with Arduino, Raspberry PI and BeagleBone Black" Mc Graw Hill Publication.

Course Outcome :

After Completion of the Course, Student will able to :

No	Course Outcomes	RBT Level*
01	Understand the basic IOT architecture, its functioning and interfaces.	UN
02	Identify different IOT protocols with its elements and functioning.	UN
03	Application the connection of smart objects in the network with performance.	AP
04	Application of various IOT concepts in real life scenarios.	AP
05	Analyze various application protocols of transport layer for various real time applications.	AN

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

Suggested Course Practical List :

The practical work will be carried out based on the content covered during the academic session.

List of Laboratory / Learning Resources Required :

- List of Software : Python, R, MATLAB
- List of Open Source Tools/Simulator:
  https://www.tutorialspoint.com/internet_of_things/index.htm
  https://www.cisco.com/c/en_in/solutions/internet-of-things/overview.htm
- List of Useful websites/MOOCs:
  https://onlinecourses.nptel.ac.in/noc22_cs53/preview
  https://nptel.ac.in/courses/108108123

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