Internet of Things

Programme: B.Tech. CCE Year: 3rd Semester: V
Course: Core Credits: 3 Hours: 40

Course Context and Overview (100 words):
The IoT has the power to change the world. Looking at the current market trends, business and innovation opportunities, IoT can be considered as part of the new industrial revolution. This course includes the basics of the Internet of things considering all major components, including, Hardware, software, data and security elements. After the end of this course students will be able to implement their innovative ideas using IoT.

Prerequisites Courses: Nil

Course outcomes (COs):

On completion of this course, the students will have the ability to:
CO1: Understand the IoT Architecture, Concepts and key elements.
CO2: Work on latest processing elements for IoT and will be able to implement the interfacing of various components.
CO3: Understand various communication protocols associated with IoT
CO4: Work on various cloud based services for IoT.
CO5: Understand and implement network and security measures.

Course Topics:

Topics	**Lecture Hours**
UNIT – I: Introduction	**3**
1.1 General definitions, Conceptual framework,	1
1.2 Key Elements and technologies	1
1.3 Architectural Domains and their relationships	1
UNIT 2 **Embedded System for IoT:**	**8**
2.1 Latest microcontroller for IoT with Hands-on	2
2.2 Understanding and managing memory	1
2.3 SPI, I2C, RS232 and Power line Communication with Hands-on	2
2.4 Industrial Ethernet, Modbus and BACNET communication	3

UNIT 3 **Web and Internet Connectivity**	**7**
3.1 Web Communication Protocols	1
3.2 SOAP, REST, RESTful HTTP and WebSockets	2
3.4 IP Addressing, MAC, HTTPS, FTP with Hands-on	2
3.5 Telnet and other application Layer protocols	2
UNIT 4 **Data Handling and Sensor Networks**	**12**
4.1 Data Acquiring and organizing	2
4.2 Data Processing and Analytics	2
4.3 Knowledge Acquiring and Managing	2
4.4 Everything as a Service and Cloud Service Models	4
4.5 IoT Cloud Based Services and platforms with Hands-on	2
UNIT 5 **Sensor Networks and Security**	**10**
5.1 Sensor Data Communication Protocols	2
5.2 Wireless Sensor Networks	2
5.3 Privacy Security and Vulnerabilities	2
5.4 IoT Security Tomography and Layered Attack Model	2
5.5 Identity Management and Security Model	2

Textbook references (IEEE format):

[1] Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill

Text Books:

[1] Internet of Things: Principles and paradigms, Edited by Rajkumar Buyya and Amir Dastjerdi , *Morgan Kaufmann*

[2] Precision - Internet of Things Author: Timothy Chou ISBN: 9789352605385

[3] Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley.

Reference books:

[1] Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill

Evaluation Methods:

Item	**Weightage (%)**
Minimum Attendance to consider course evaluation is 75%	
Quiz	10
Laboratory work	20
Midterm	30
Final Examination	50

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