CSH 613 Internet of Things

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./Week	Class Test -12Marks
Tutorials: 1 hr./Week	Teachers Assessment - 6Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 marks

Prerequisite: Basics of Networking, Internet Technology

Course Objectives:
   The objectives of the course are:

1. Understand general concepts of Internet of Things (IoT)
2. Demonstrate evolution from M2M to IoT
3. Study general architecture of IoT and prototyping in IoT
4. Standardization of IoT platform
5. Evaluate security issues in IoT applications

Detailed Syllabus

UNIT I (10 hrs.)
Introduction to IoT: Internet of Things: IoT: An overview, Introduction, Characteristics, IoT technology, IoT as a Network of Networks, IoT architecture, IoT developments, Smart Technology, Brief introduction of smart technology, Smart devices, Smart environment. IoT Components, Basic Principles, Embedded technology Vs IoT, Sensors, Wireless sensor networks, Arduino, Raspberry Pi.

UNIT- II (8 hrs.)
M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT.

UNIT- III (8 hrs.)
IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Constraints affecting design in IoT world-Introduction, Technical design Constraints

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UNIT- IV (10 hrs.)

Prototyping in IoT- Basics of prototypes, Prototyping in IoT, Communication in IoT, Prototyping model, Data handling in IoT, **Operating Systems for Low-End IoT Devices,** Open-Source OSs, Closed Source OSs

UNIT- V (8 hrs.)

Architectural Approach for IoT Empowerment: Introduction, defining a Common Architectural Ground, IoT Standardization, M2M Service Layer Standardization, OGC Sensor Web for IoT, IEEE, IETF and ITU-T Standardization activities, Interoperability Challenges, Physical vs. Virtual, Solve the Basic First, Data Interoperability, Semantic Interoperability, Organizational Interoperability, Eternal Interoperability, Importance of Standardization, Plan for Validation and testing.

UNIT- VI (8 hrs.)

Identity Management Models in IoT: Introduction, Vulnerabilities of IoT, Security requirements, Challenges for a secure Internet of Things, identity management, Identity portrayal, Different identity

Management model: Local identity, Network identity, Federated identity, Global web identity.

Text and Reference Books

1. Olivier Hersent, David Boswarthick, Omar Elloumi "The Internet of Things key applications and protocols", Wiley
2. Michael Miller "The Internet of Things" Pearson
3. Adrian McEwen, Hakin Cassimally "Designing the Internet of Things" Wiley India
4. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.
5. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014.

Course Outcomes:
1. Understand the basics of IoT.
2. Visualize the evolution from M2M to IoT.
3. Illustrate the architecture of IoT using various views.
4. Understand various standardizations for IoT empowerment.
5. Enlist vulnerabilities and security issues for IoT network.