Course code	Course Name	L-T-P - Credits	Year of Introduction
EE472	Internet of Things	3-0-0-3	2016

Prerequisite: Nil

Course Objectives

- To introduce IoT and impart its Vision
- To understand IoT Market perspective.
- To know data and knowledge Management and use of devices in IoT Technology.
- To understand State of the Art – IoT Architecture.
- To understand real world IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Syllabus

Internet in general and Internet of Things, IoT Technology Fundamentals, Communication Technology for IoT, Data Management, Sensors and security of IoT, Standardisation and Protocol, IoT architectures, Embedded design for IoT, Case Studies and smart applications

Expected outcome.

The students will be able to

i. Explain in a concise manner how the general Internet as well as Internet of Things work.
ii. Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
iii. Use basic measurement tools to determine the real-time performance of packet based networks.
iv. Analyse trade-offs in interconnected wireless embedded sensor networks.

Text Books:

1. Adrian McEwen (Author), Hakim Cassimally." Designing the Internet of Things" 1st Edition, Wiley, 2014
2. Vijay Madisetti and ArshdeepBahga, **"**Internet of Things (A Hands-on-Approach)"**,** 1st Edition, VPT, 2014

References:

1. Ovidu Vermesan and Peter Friess (Ed) Internet of Things - From Research and Innovation to Market Deployment -RIVER PUBLISHERS
2. Ovidu Vermesan and Peter Friess (Ed), The Internet of Things : Converging Technologies for Smart Environments and Integrated Ecosystems, , River Publishers.
3. Samuel Greengard , The Internet of Things (The MIT Press Essential Knowledge series)Paperback – March 20, 2015

Course Plan

Module	Contents	Hours	Sem Exam Marks
I	Introduction : Definition , Internet of Things Vision, Internet of Things Today, Internet of Things Tomorrow , Potential Success Factors of Internet of Things , IoT Application Areas , IoT Functional View	6	15%
II	IoT Technology Fundamentals : Internet of Things Layered Architecture , IoT Related future Internet Technologies: Cloud computing , IoT and Semantic Technologies; Networking Technology , Communication Technology : Devices and gateways , Local and wide area networking , WIRELESS AND	8	15%

	IoT : Overview , Broadcast, Sensor Networks, Wi-Fi , Bluetooth ,Other Low Power Radios		
FIRST INTERNAL EXAMINATION			
III	Data management ,DCA, Big Data , Semantic Sensor Networks and Semantic Annotation of Data ,Virtual Sensors ; Security , Privacy and Trust for Internet of Things :Security for Internet of Things ,Privacy for Internet of Things , Trust for Internet of Things ;	8	15%
IV	IoT related Standardisation : Role of Standardisation , Current Situation , Interoperability of IoT , Standards considerations and Protocols , IoT Protocols Convergence : MQTT ,CoAP , AMQP, DDS , API , REST , XMPP IoT Architectural Overview : Building an IoT architecture, Main design principles and needed capabilities, IoT Architecture Outline ;	8	15%
SECOND INTERNAL EXAMINATION			
V	Embedded Design for IoT : CPU, I/O devices, clock, memory, address and data buses, Tristate Logic ,Embedded System Definition & Real time applications ,CISC vs. RISC, OS vs. RTOS, Application Software vs. Embedded Software (Drivers & BSPs)	8	20%
VI	Case Study & Advanced IoT Applications: Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / ARM Cortex/ Arduino) Internet of Things SMART Applications : Energy management, Traffic management, IoT for Home ,Cities , Smart Energy and Smart Grid , Smart Logistics and Retails	8	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100 Exam Duration: 3Hourrs.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.