

**Internet of Things and Applications**  
**(Open Elective - IV)**

SYLLABUS FOR B.E. VI - SEMESTER (EEE & IT)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: <b>U23OE610EC</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>		<b>COURSE OUTCOMES</b>	
1. To enable students to understand the fundamentals and architecture of the Internet of Things (IoT) and explore its role in enhancing quality of life through interconnected devices and systems.		On completion of the course, students will be able to	
2. To familiarize learners with various IoT communication protocols such as MQTT, AMQP, CoAP, and mDNS, and equip them with the knowledge to address real-world design constraints, including technical limitations and power management.		1. Understand the Architectural Overview of IoT	
3. To introduce students to IoT hardware platforms, focusing on the selection and integration of microcontrollers and Raspberry Pi for prototyping and building practical IoT applications using Python.		2. Enumerate the need and the challenges in Real World Design Constraints	
4. To provide an in-depth understanding of IoT data representation, visualization, and device-level interactions, along with remote control capabilities and power conditioning techniques using energy harvesting methods.		3. Compare various IoT Protocols.	
5. To expose students to real-world case studies and application domains of IoT such as Smart Cities, Connected Vehicles, Smart Agriculture, Healthcare, and Activity Monitoring, fostering innovation in interdisciplinary domains.		4. Build basic IoT applications using Raspberry Pi.	
		5. Understand IoT usage in various applications.	

**CO-PO Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1											1	1	
CO2	3	2					1						1	1	2
CO3	3	1											1	1	
CO4	3	1			2								1	1	1
CO5	3	2		1		2	2		2			2		2	2

**UNIT - I : OVERVIEW**

Introduction to IoT – Improving Quality of life.

IoT-An Architectural Overview, M2M and IoT Technology Fundamentals- Devices and gateways, Data management, Introduction to cloud IOT platforms like MS Azure, AWS IOT, Google Cloud IOT, Thingworx, Business processes in IoT, IoT Enabling Technologies, IoT Levels & Deployment.

**UNIT - II : Real-World Design Constraints**

Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Power Management in IoT device, Power conditioning using energy harvesting.

**UNIT - III : IOT PROTOCOLS**

Introduction to MQTT, Quality of services in MQTT, standards and security in MQTT.

Introduction and implementation of AMQP, Implementation of CoAP and mDNS.

**UNIT - IV : Device for IoT**

Choice of Microcontroller, Introduction to Raspberry Pi, Features of Pi, Programming platform, Python programming for Pi. Building basic IoT Applications using Raspberry Pi.

**UNIT - V : IoT case studies**

Smart Cities and Smart Homes, Connected Vehicles, Agriculture, Healthcare, Activity Monitoring.

**Learning Resources:**

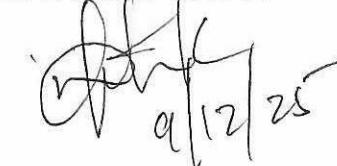
1. Jan Holler, Vlasis Tsatsis, Catherine Mulligan, Stefan Avesand, Stamatios Kournouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118- 47347-4, Wiley Publications
5. <https://nptel.ac.in/courses/106105166/5>
6. <https://nptel.ac.in/courses/108108098/4>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests :  Max. Marks for each Internal Test :
2. No. of Assignments :  Max. Marks for each Assignment :
3. No. of Quizzes :  Max. Marks for each Quiz Test :

Duration of Internal Tests: 90 Minutes



  
a/12/25