

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
ACCREDITED BY NAAC WITH 'A++' GRADE  
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

## 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

COURSE OBJECTIVES	COURSE OUTCOMES
<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ol>	<p>On completion of the course, students will be able to</p> <ol style="list-style-type: none"> <li>Understand the Architectural Overview of IoT</li> <li>Enumerate the need and the challenges in Real World Design Constraints</li> <li>Compare various IoT Protocols.</li> <li>Build basic IoT applications using Raspberry Pi.</li> <li>Understand IoT usage in various applications.</li> </ol>

### 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	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:

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

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

- No. of Internal Tests : **2** Max. Marks for each Internal Test : **30**
- No. of Assignments : **3** Max. Marks for each Assignment : **5**
- No. of Quizzes : **3** Max. Marks for each Quiz Test : **5**

Duration of Internal Tests: 90 Minutes

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9/12/25