

|                              |                                                                                      |
|------------------------------|--------------------------------------------------------------------------------------|
| <b>Branch Name:</b>          | IMCA                                                                                 |
| <b>Program Code:</b>         | CS301                                                                                |
| <b>Course Code</b>           | 1CS3010706T                                                                          |
| <b>Course Title</b>          | Internet of Things                                                                   |
| <b>Pre-requisite Course:</b> | Computer networks, Basics of Microcontroller and Processors, Fundamentals of sensors |

### Course Objective:

1. The Internet of Things (IoT) has emerging requirements with different ways of working and industry 4.0 based on IoT only.
2. IoT is useful in many sectors like consumer, commercial, infrastructure, health, and industry and military.
3. It is required to impart basic understanding and implementation of various requirements of the IoT.

### Teaching and Examination Scheme:

| Teaching Scheme (Hours per week) |          |           |        | Evaluation Scheme (Marks) |                       |                       |                       |       |
|----------------------------------|----------|-----------|--------|---------------------------|-----------------------|-----------------------|-----------------------|-------|
| Lecture                          | Tutorial | Practical | Credit | Theory                    |                       | Practical             |                       | Total |
|                                  |          |           |        | University Assessment     | Continuous Assessment | University Assessment | Continuous Assessment |       |
| 4                                | -        | -         | 4      | 60                        | 40                    | -                     | -                     | 100   |

### Course Contents:

| Unit No | Topics                                                                                                                                                                                                                                                                                                                                                                                                                              | Total Hours | Weightage (%) |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|
| 1       | <b>Introduction to IOT:</b><br>Genesis of IOT, IOT and digitization, IOT impact, Convergence of IT and IOT, IOT challenges<br><b>IOT Network Architecture and Design:</b> Drivers behind new Network Architecture, Comparing IOT architectures, Simplified IOT architecture, Core of IOT functional stack, IOT data management and compute stack.                                                                                   | 10          | 25            |
| 2       | <b>Engineering IOT Networks:</b><br>Sensors, Actuators, Smart Objects, Wireless Sensor Networks and protocols for Wireless Sensor Networks.<br><b>Connecting Smart Objects:</b> Standardization, Range, Topology, Frequency bands, Power Consumption, Constrained Devices, Constrained Node Networks, Data Range, Throughput, Latency, Determinism, Overhead and Payload, IoT access technologies, Various competitive technologies | 12          | 25            |
| 3       | <b>IP as IOT Network Layer:</b><br>Business Case for IP, Need for Optimization, Optimizing IP for IOT, Profiles and compliances, Security in IoT                                                                                                                                                                                                                                                                                    | 12          | 25            |
| 4       | <b>Application Protocols for IOT:</b><br>Transport Layer, IOT Application Transport Methods: SCADA and MQTT, Introduction to data analytics for IoT, Machine learning, Edge streaming analytics.                                                                                                                                                                                                                                    | 11          | 25            |

**Text Books:**

*Blockchain Basics: A Non-Technical Introduction in 25 Steps* – Daniel Drescher.

**Reference Books:**

- David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton, Jerome Henry, “IOT Fundamentals: Networking Technologies, Protocols and Cases for the Internet of Things”, cisco press.
- Rahul Dubey, “An Introduction to Internet of Things: Connecting Devices, Edge Gateway, and Cloud with Applications”, Cengage India Publication.
- Donald Noris, “The Internet of Things: Do it yourself Projects with Arduino, Raspberry PI and BeagleBone Black” Mc Graw Hill Publication.

**Course Learning Outcomes (CLO): On completion of this course, the students will be able to:**

| CLO  | Description                                                                                  | Bloom's Taxonomy Level |
|------|----------------------------------------------------------------------------------------------|------------------------|
| CLO1 | Understand the basic IOT architecture, its functioning and interfaces.                       | L2 – Understand        |
| CLO2 | Identify different IOT protocols with its elements and functioning.                          | L3 – Apply             |
| CLO3 | Application the connection of smart objects in the network with performance.                 | L3 – Apply             |
| CLO4 | Application of various IOT concepts in real life scenarios.                                  | L4 – Analyze           |
| CL05 | Analyze various application protocols of transport layer for various real time applications. | L5 – Evaluate          |

**Mapping of CLOs with POs & PSOs**

| Course Learning Outcomes | Program Out comes( POs) |     |     |     |     |     |     |     |     |      |      |      | Program Specific Outcomes (PSOs) |      |
|--------------------------|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|----------------------------------|------|
|                          | PO1                     | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1                             | PSO2 |
| CLO1                     | L                       | M   | L   | L   | -   | M   | M   | -   | L   | H    | L    | -    | -                                | M    |
| CLO2                     | M                       | M   | L   | M   | -   | L   | M   | -   | L   | H    | L    | -    | -                                | M    |
| CLO3                     | L                       | M   | L   | M   | -   | H   | M   | -   | L   | H    | L    | -    | -                                | M    |
| CLO4                     | -                       | M   | L   | H   | M   | -   | M   | L   | M   | -    | H    | L    | L                                | M    |
| CLO5                     | -                       | M   | L   | M   | -   | H   | M   | -   | L   | H    | L    | -    | -                                | M    |

**H:High, M:Medium, L:Low**