# 5MCAEC22: INTERNET OF THINGS

**Total No. of Hours: 52** **Hours/Week: 04**

**Course Objective:** To introduce the implementation of web based services on IoT devices

**Course Outcome:** Students will be able to

**CO1:** Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
**CO2:** Analyze the societal impact of IoT systems and its domains.
**CO3:** Develop critical thinking skills.
**CO4:** Analyze, design or develop parts of an Internet of Things solution and map it toward selected business model(s)
**CO5**: Evaluate the impact of cloud technology and its issues related to the Internet of Things.

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| Unit I | **Introduction to Internet of Things**: Definition and Characteristics of IoT,Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics,Communication protocols, Embedded Systems, IoT Levels and Templates - Domain Specific IoT's – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health andLifestyle | 12 hrs |
| Unit II | **IoT and M2M** : Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER | 10 hrs |
| Unit III | **Introduction to Python** : Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling. **Python packages**: JSON, XML, HTTPLib, URLLib, SMTPLib | 10 hrs |
| Unit IV | **IoT Physical Devices and Endpoints**: Introduction to Raspberry PI-Interfaces (serial, SPI, I2C). **Programming** : Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins. | 10 hrs |
| Unit V | **IoT Physical Servers and Cloud Offerings** : Introduction to Cloud Storage models and communication APIs. **Webserver** : Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API. | 10 hrs |

**REFERENCE BOOKS**

*[1]* ArshdeepBahga and Vijay Madisetti,"*Internet of Things- A Hands-on Approach"*
[2] Matt Richardson & Shawn Wallace, *"Getting Started with Raspberry Pi"*, O'Reilly (SPD), 2014, ISBN: 9789350239759
[3] Marco Schwartz, "Internet of Things with the Aruino Yun", Packt Publishing, 2014.