22CA3E5: INTERNET OF THINGS (IoT)

Course Name	Internet of Things (IoT)		L	T	P	C	CIA	SEE	TM
Course Code	22CA3E5		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2022	Year of Revision: 2023			Percentage of Revision: 70%				
L-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-Internal Marks, **SEE**-External Marks, **TM**-Total Marks									

Course Descriptive and Purpose: This course aims to provide students with a comprehensive understanding and knowledge of various aspects of the Internet of Things (IoT). These areas of focus include an overview of IoT, models and layers in IoT systems, standardization efforts, protocols and design principles applicable to connected devices, principles of internet connectivity within IoT, a deep dive into IoT protocols and application layer protocols, techniques for acquiring IoT data, and an exploration of business models and processes relevant to IoT applications.

Course Objectives: The course help the students to understand and gain knowledge on *Over View* of *Internet of Things*, *Models*, *Layers* & S*tandardization, Protocols* & *Design Principles* for Connected Devices, *Internet Connectivity Principles*, *Protocols* & *Application Layer Protocols, Data Acquiring*, *Business Models* and *Business Processes*.

Specific objectives include:
- To attain knowledge over view of *Internet of Things*.
- To understand *Models*, *Layers* & *Standardization*.
- To apply *Protocols* & *Design Principles* for Connected Devices.
- To understand *Internet Connectivity Principles*, *Protocols* & Application Layer Protocols.
- To understand *Data Acquiring*, *Business Models* and *Business Processes*.

Course Outcomes: On successful completion
CO1: This course provides a comprehensive understanding of the Internet of Things (IoT), covering its technology, sources, M2M communication, real-world examples, design principles for connected devices, and business models, enabling students to navigate and contribute to the IoT ecosystem effectively.
CO2: This course equips students with a deep understanding of design principles for connected devices in IoT/M2M systems, including OSI stack modifications, ETSI M2M domains, communication technologies, data management, and affordability considerations, enabling them to design and manage efficient and cost-effective IoT solutions.
CO3: This course imparts design principles and knowledge of web connectivity for connected devices, covering web communication protocols, message communication protocols, and practical web connectivity techniques, enabling students to create effective web-connected device solutions.
CO4: This course equips students with the skills to acquire, organize, and rrange data in IoT/M2M contexts, covering data acquisition, storage, business processes, and integration into enterprise systems, facilitating their ability to leverage IoT data for applications, services, and business processes effectively.
CO5: This course empowers students to master data acquisition, organization, and analytics within IoT/M2M, enabling them to drive innovative applications, services, and business processes while efficiently integrating data into enterprise systems.

UNIT-I (12 Hours)

The Internet of Things: An Overview of Internet of Things, Internet of Things Technology, Behind IoT Sources of the IoT, M2M Communication, Examples of IoT, Design Principles for Connected Devices, Business Models for Business Processes in the Internet of Things.

UNIT-II (12 Hours)

Design Principles for Connected Devices: IoT / M2M systems layers and Designs Standardizations, Modified OSI Stack for the IoT / M2M Systems, ETSI M2M Domains and High-level Capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway ease of Designing and Affordability.

UNIT-III (12 Hours)

Design Principles for the Web Connectivity: Design Principles for the Web Connectivity for Connected Devices, Web Communication Protocols for Connected Devices, Message Communication Protocols for Connected Devices, Web Connectivity for Connected Devices.
Internet Connectivity Principles: Introduction, Internet Connectivity, Application Layer Protocols: *HTTP, HTTPS, FTP, Telnet.*

UNIT-IV (12 Hours)

Data Acquiring, Organizing and Analytics in IoT / M2M: Introduction, Applications / Services / Business Processes, IOT / M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT-V (12 Hours)

Data Acquiring, Organizing and Analytics in IoT / M2M: Introduction, Applications / Services / Business Processes, IOT / M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

Prescribed Text Book			
	Author	Title	Publisher
1	Rajkamal	Internet of Things : Architecture, Design Principles and Applications	McGraw Hill Higher Education

Reference Text Book			
	Author	Title	Publisher
1	Adrian McEwen and Hakim Cassimally	Designing the Internet of Things	Wiley
2	CunoPfister	Getting Started with the Internet of Things.	Oreilly

Course Focus: Employability

Websites of Interest:

1. https://dzone.com/iot-developer-tutorials-tools-news-reviews
2. https://www.ibm.com/blogs/internet-of-things/

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE

(An Autonomous College in the jurisdiction of Krishna University)

M.C.A, Third Semester

Course Name: Internet of Things

Course Code: 22CA3E6

(w.e.f admitted batch 2022-23)

Time: 3 Hours **Max Marks: 70**

SECTION-A

Answer ALL questions **(5×4=20 Marks)**

1.(a) Explain *M2M communication.* (CO1,L2)

(or)

(b) Explain *Internet of Things Technology.* (CO1,L2)

2.(a) What is *Gateway*. (CO2,L1)

(or)

(b) List out *Communication Technologies for IoT*. (CO2,L1)

3.(a) What is *Communication Protocol*? (CO3,L1)

(or)

(b) List out *Application Layer Protocols.* (CO3,L1)

4.(a) Explain *Business Processes for IoT*. (CO4,L2)

(or)

(b) Explain *Organizing Data in IoT*. (CO4,L2)

5.(a) Explain *Transactions for Business Processes.* (CO5,L2)

(or)

(b) Explain *Active* and *Passive Devices*. (CO5,L2)

SECTION-B

Answer Five Questions Choosing One Question from Each Unit.

All Questions Carry Equal Marks. **(5×10=50 Marks)**

6. (a) Explain *overview of Internet of Things.*(CO1,L2)

(or)

(b) Explain *Design Principles for Connected Devices*. (CO1,L2)

7. (a) Apply *IoT / M2M Designs Standardizations* with examples. (CO2,L3)

(or)

(b) Build *Modified OSI Stack for the IoT / M2M Systems*. (CO2,L3)

8. (a) What are *Design Principles for the Web Connectivity*.(CO3,L1)

(or)

(b) What are *Message Communication Protocols for Connected Devices*.(CO3,L1)

9. (a) Explain *IOT / M2M Data Acquiring and Storage*.(CO4,L2)

(or)

(b) Explain *IoT Business Models for Business Processes* with example.(CO4,L2)

10. (a) Explain *Applications and Service Business Processes for IoT*.(CO5,L5)

(or)

(b) Explain *Integration and Enterprise Systems*.(CO5,L5)