INTRODUCTION TO IoT

B.Tech.Semester –I/II (Common for all Branches)

Course code	25ESC-IOT-101H				
Category	Engineering Science Course				
Course title	Introduction to IoT				
Scheme and Credits	**L**	**T**	**P**	**Credits**	Semester-I/II
	3		**0**	**3**	
Classwork	25 Marks				
Examination	50 Marks				
Total	75 Marks				
Duration of Exam	03 Hours				

COURSE OBJECTIVES

- To understand basic networking concepts and their role in IoT.
- To learn about IoT components, sensors, and actuators.
- To explore data processing and cloud technologies used in IoT.
- To study real-life applications of IoT in various domains.

S. No	Topics to be covered	Teaching Methodology	Activity	Remarks
SECTION A – Unit 1: Basics of Networking and IoT Introduction (CO101.1)				
1	Introduction to Computer Networks	Chalk & Talk	Class discussion on "What is a Network?"	
2	Network Types: LAN, MAN, WAN, PAN	Chalk & Talk	Diagram of network types	
3	Layered Network Models: OSI and TCP/IP	PPT	Draw OSI model layers	

S. No	Topics to be covered	Teaching Methodology	Activity	Remarks
4	Introduction to IoT: Concept and Definition	Chalk & Talk	Real-life IoT examples discussion	
5	Evolution of IoT	PPT	Timeline creation of IoT development	
6	Enabling Technologies of IoT	Chalk & Talk	Identify technologies behind IoT	
7	Complex Interdependence of Technologies	PPT	Group discussion	
8	IoT Networking Components	Chalk & Talk	Diagram of IoT system components	
9	IoT Sensing and Actuation – Introduction	Chalk & Talk	Demonstration using simple sensor module	
10	Sensors and their Characteristics	Chalk & Talk	List types of sensors used in IoT	
11	Sensorial Deviations and Sensing Types	PPT	Activity: identify errors in sensor readings	
12	Sensing Considerations in IoT	Chalk & Talk	Class discussion	
13	Actuators and their Role in IoT	Chalk & Talk	Practical example: motor or relay	

S. No	Topics to be covered	Teaching Methodology	Activity	Remarks
14	Actuator Types and Characteristics	PPT	Table comparison of actuators	
15	Summary of IoT Sensing and Actuation	Chalk & Talk	Quiz on Unit 1 topics	
SECTION B – Unit 2: IoT Processing and Topologies (CO101.2)				
16	IoT Processing Topologies – Introduction	Chalk & Talk	Diagram of centralized vs distributed	
17	Data Formats in IoT	Chalk & Talk	JSON data example	
18	Importance of Processing in IoT	Chalk & Talk	Discussion: edge vs cloud processing	
19	Processing Topologies in IoT Systems	PPT	Diagram illustration	
20	IoT Device Design Considerations	Chalk & Talk	Analyze IoT device specifications	
21	IoT Device Selection Criteria	Chalk & Talk	Compare Arduino vs Raspberry Pi	
22	Processing Offloading in IoT	PPT	Case discussion on computation offload	
23	Integration of Sensing,	Chalk & Talk	Class diagram exercise	

S. No	Topics to be covered	Teaching Methodology	Activity	Remarks
	Processing and Communication			
24	Edge, Fog and Cloud-based Processing	Chalk & Talk	Draw layered architecture	
25	Summary and Review of IoT Processing Concepts	Chalk & Talk	Quiz/recap activity	
SECTION C – Unit 3: Associated IoT Technologies (Cloud Computing) (CO101.3)				
26	Cloud Computing: Introduction and Definition	Chalk & Talk	Cloud examples discussion	
27	Virtualization in Cloud Computing	PPT	Diagram of hypervisor layers	
28	Cloud Service Models: IaaS, PaaS, SaaS	Chalk & Talk	Table of differences	
29	Cloud Models: Public, Private, Hybrid	Chalk & Talk	Diagram drawing activity	
30	Service-Level Agreement (SLA) in Cloud Computing	Chalk & Talk	Review sample SLA document	
31	Cloud Implementation	Chalk & Talk	Discussion on deployment methods	

S. No	Topics to be covered	Teaching Methodology	Activity	Remarks
32	Sensor-Cloud: Sensors-as-a-Service	PPT	Example: AWS IoT integration	
SECTION D – Unit 4: IoT Case Studies (CO101.4)				
33	Agricultural IoT – Introduction	Chalk & Talk	Discussion on smart irrigation	
34	Agricultural IoT Case Study	PPT	Analyze a real project (e.g., soil monitoring)	
35	Vehicular IoT, Healthcare IoT, and IoT Analytics – Introduction & Case Studies	Chalk & Talk	Group presentations and review	

COURSE OUTCOMES (CO):

By the end of the Course, Students will be able to:

CO1 Describe the evolution of IoT and IoT networking components in IoT.
CO2 Classify and analyze various sensing devices and actuator types.
CO3 Demonstrate the processing in IoT and Explain Associated IOT Technologies.
CO4 Illustrate architecture of IOT Applications.

Suggested Text Books:

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, “Introduction to IoT”, Cambridge University Press 2021.

Reference:

2. S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press.

3. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”,1st Edition, VPT, 2014.
4. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013.