DEPARTMENT OF COMPUTER ENGINEERING AND IOT

LESSON PLAN

SUBJECT: CLOUD AND FOG COMPUTING IN IOT

BRANCH: 4TH SEM, CE & IOT

FACULTY NAME: Barsha Rani Patel

Jharsuguda Engineering School, Jharsugu

After completion of the course, the students will be able to:

- Describe the key concepts and components of IoT, cloud computing, and fog computing and their roles in IoT applications.
- Explain the different cloud computing service models (IaaS, PaaS, SaaS) and deployment models (Public, Private, Hybrid) and their relevance to IoT.
- Identify the components and protocols used in fog computing architectures, including fog nodes, networking protocols, and middleware for IoT systems.
- Evaluate the security, privacy, and reliability challenges in cloud and fog computing for IoT.
- Design an IoT system architecture using cloud and fog computing to enable real-time data processing.

LESSON PLAN	
JHARSUGUDA ENGINEERING SCHOOL,JHARSUGUDA	
Name of the Faculty: Mrs. Barsha Rani Patel	**Academic Year:** 2025-26
Course No.: Th.5 © CLOUD AND FOG COMPUTING IN IOT	**Course Name: DIPLOMA**
Program: Diploma	**Branch: COMPUTER ENGINEERING AND IOT**
Semester : 4th	

Sl. No.	Period / Class	Time (min)	Unit	Topic to be covered	Teaching method
1.	1.	60	I	**Introduction:** IoT Fundamentals, Components & Architecture [9]	Chalk & talk + PPT
2.	2.	60	I	Challenges in IoT Implementation [10]	Chalk & talk + Real life example
3.	3.	60	I	**Cloud Computing:** Intro & Service Models (IaaS, PaaS, SaaS) [11]	Chalk & talk + NPTEL VIDEO
4.	4.	60	I	Deployment Models: Public, Private, Hybrid, Community Cloud [12]	Chalk & talk + PPT
5.	5.	60	I	Limitations of Cloud Computing for IoT Applications [13]	Chalk & talk + Case Study
6.	6.	60	I	**Fog Computing:** Introduction & Role of Edge/Fog nodes [14]	Chalk & talk + NPTEL VIDEO
7.	7.	60	I	Cloud vs. Fog vs. Edge Computing: A Comparative Study [15]	Chalk & talk + Comparison Chart
8.	8.	60	I	Summary of Unit I & Class Discussion	Questioner + Discussion

Sl. No.	Period / Class	Time (min)	Unit	Topic to be covered	Teaching method
9.	9.	60	I	**Revision Unit-1** & Doubt Clearing	Revision + Doubt clear
10.	10.	60	II	**Cloud for IoT:** Cloud Services (AWS IoT, Azure IoT, Google Cloud) [16]	Chalk & talk + Live Demo
11.	11.	60	II	Cloud-based IoT Architecture: Data storage & processing [17]	Chalk & talk + PPT
12.	12.	60	II	**Big Data in Cloud:** Introduction to Apache Spark for IoT [18]	Chalk & talk + NPTEL VIDEO
13.	13.	60	II	Hadoop and NoSQL Databases for IoT Data [19]	Chalk & talk
14.	14.	60	II	IoT Data Management in the Cloud [20]	Chalk & talk + PPT
15.	15.	60	II	Security aspects in Cloud-based IoT Systems [21]	Chalk & talk + Real life example
16.	16.	60	II	Cost Considerations in Cloud-based IoT [22]	Chalk & talk
17.	17.	60	II	Performance Considerations in Cloud-based IoT [23]	Chalk & talk + Case Study
18.	18.	60	II	**Revision Unit-2** & Assessment	Questioner + Revision
19.	19.	60	III	**Fog Architecture:** Fog Node Deployment (Gateways, Routers) [24]	Chalk & talk + PPT

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20.	20.	60	III	Fog Infrastructure: Edge Servers & Local Data Centers [25]	Chalk & talk
21.	21.	60	III	Fog Middleware: OpenFog Consortium & Cisco Framework [26]	Chalk & talk + NPTEL VIDEO
22.	22.	60	III	**Fog Protocols:** MQTT, COAP, WebSockets [27]	Chalk & talk + PPT
23.	23.	60	III	LPWAN Protocols in Fog Computing [28]	Chalk & talk
24.	24.	60	III	**Containerization:** Docker for IoT [29]	Chalk & talk + Demo Video
25.	25.	60	III	Kubernetes for IoT Orchestration [30]	Chalk & talk
26.	26.	60	III	Resource Allocation & Virtualization in Fog Computing [31]	Chalk & talk + PPT
27.	27.	60	III	**Revision Unit-3** & Quiz	Questioner + Revision
28.	28.	60	IV	**Data Processing:** IoT Data Processing in Fog and Edge [32]	Chalk & talk
29.	29.	60	IV	Real-time Data Analytics in Fog Computing [33]	Chalk & talk + Real life example
30.	30.	60	IV	Introduction to AI and Machine Learning at the Edge [34]	Chalk & talk + NPTEL VIDEO

Sl. No.	Period / Class	Time (min)	Unit	Topic to be covered	Teaching method
31.	31.	60	IV	TensorFlow Lite: Concept and Application [35]	Chalk & talk + PPT
32.	32.	60	IV	Edge AI Models: Implementation Strategies [36]	Chalk & talk
33.	33.	60	IV	Benefits of Edge AI for Latency and Bandwidth [37]	Chalk & talk + Discussion
34.	34.	60	IV	Case Studies: AI in Smart Cameras/Sensors [38]	Chalk & talk + Case Study
35.	35.	60	IV	Challenges in Edge AI Processing [39]	Chalk & talk
36.	36.	60	IV	**Revision Unit-4** & Doubt Clearing	Questioner + Revision
37.	37.	60	V	**Security & Privacy:** Security Challenges in Cloud/Fog IoT [40]	Chalk & talk + NPTEL VIDEO
38.	38.	60	V	Authentication Mechanisms: OAuth [41]	Chalk & talk + PPT
39.	39.	60	V	Access Control Mechanisms in IoT [42]	Chalk & talk
40.	40.	60	V	Blockchain for IoT Security [43]	Chalk & talk + Real life example
41.	41.	60	V	Data Encryption Techniques in IoT Cloud & Fog [44]	Chalk & talk
42.	42.	60	V	Threat Detection & Anomaly Detection in Fog [45]	Chalk & talk + PPT

Sl. No.	Period / Class	Time (min)	Unit	Topic to be covered	Teaching method
43.	43.	60	V	Regulatory Compliance: GDPR 46	Chalk & talk
44.	44.	60	V	NIST IoT Security Framework 47	Chalk & talk + NPTEL VIDEO
45.	45.	60	V	**Final Revision Unit-5** & Full Course Wrap-up	Questioner + Revision

REFERENCES:

1. "Fog and Edge Computing: Principles and Paradigms" – Rajkumar Buyya, Satish Narayana Srirama.
2. "Cloud Computing for IoT" – Beniamino Di Martino, Kuan-Ching Li.
3. "Internet of Things: Principles and Paradigms" – Rajkumar Buyya, Amir Vahid Dastjerdi.
4. "Industrial IoT: Challenges, Design Principles, Applications, and Security" – Anastasius Gavras.

Barsha Rani Patel.

Faculty Signature

HOD Signature