

21IoT14	FOG AND EDGE COMPUTING	L	T	P	C
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<p><u>Course Objectives</u></p> <ul style="list-style-type: none"> To understand the students about edge computing, an important branch of distributed computing and IoT with significant applications in Data Science. To implement the concepts of fog and cloud computing and exposes students to modern tools and API to deploy relevant infrastructures. 					
UNIT I	EDGE COMPUTING	9 HOURS			
<p>Fog computing requirements when applied to IoT: Scalability, Interoperability, Fog-IoT architectural model, Challenges on IoT Stack Model via TCP/IP Architecture, Data Management, filtering, Event Management, Device Management, cloudification, virtualization, security and privacy issues. Integrating IoT, Fog, Cloud Infrastructures: Methodology , Integrated C2F2T Literature by Modelling Technique re by Use-Case Scenarios , Integrated C2F2T Literature by Metrics.</p>					
UNIT II	FOG COMPUTING IN HEALTH MONITORING	9 HOURS			
<p>Exploiting Fog Computing in Health Monitoring : An Architecture of a Health Monitoring IoT-Based System with Fog Computing , Fog Computing Services in Smart E-Health Gateways, Discussion of Connected Components. Fog Computing Model for Evolving Smart Transportation Applications: Introduction , Data-Driven Intelligent Transportation Systems , Fog Computing for Smart Transportation Applications Case Study: Intelligent Traffic Lights Management (ITLM) System.</p>					
UNIT III	FOG COMPUTING APPLICATION	9 HOURS			
<p>Software Defined Networking and application in Fog Computing: Open Flow Protocol, Open Flow Switch, SDN in Fog Computing, Home Network using SDN. Security and Privacy issues: Trust and privacy issues in IoT Network, web Semantics and trust Management for Fog Computing, Machine Learning based security in Fog Computing, Cyber- Physical Energy Systems over Fog Computing</p>					
UNIT IV	INTRODUCTION TO EDGE COMPUTING	9 HOURS			
<p>Introduction to Edge Computing Scenarios and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, <u>Edge platforms</u>, Edge vs Fog Computing, Communication Models - Edge, Fog, and M2M.</p>					
UNIT V	IOT ARCHITECTURE AND CORE IOT MODULES	9 HOURS			
<p>IoT Architecture and Core IoT Modules-A connected ecosystem,IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with the examples- Edge computing with RaspberryPi, Industrial, and Commercial IoT and Edge, and Edge computing and solutions.</p>					
TOTAL PERIODS: 45					

Course Outcomes:

- Explore the need for new computing paradigms.
- Explain the major components of fog and edge computing architectures.
- Identify potential technical challenges of the transition process and suggest solutions.
- Analyze data and application requirements and pertaining issues.
- Design and model infrastructures.

Textbooks:

1. Fog Computing: Theory and Practice by Assad Abbas, Samee U. Khan, Albert Y. Zomaya
2. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt Publishing, 2020, ISBN: 9781839214806
3. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc., 2019, ISBN: 978149204322
4. David Jensen, "Beginning Azure IoT **Edge Computing**: Extending the Cloud to the Intelligent **Edge**, MICROSOFT AZURE

Reference Books:

1. Fog and Edge Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing) by Rajkumar Buyya and Satish Narayana Srirama
2. Flavio Bonomi, Rodolfo Milito, Jiang Zhu, Sateesh Addepalli, —Fog Computing and Its Role in the Internet of Things, MCC'12, August 17, 2012, Helsinki, Finland. Copyright 2012 ACM 978-1-4503-1519-7/12/08... \$15.00.
3. Shanhe Yi, Cheng Li, Qun Li, —A Survey of Fog Computing: Concepts, Applications and Issues, Mobidata'15, ACM 978-1-4503-3524-9/15/06, DOI: 10.1145/2757384.2757397, June 21, 2015, Hangzhou, China..