



Accredited with NAAC A Grade  
12-B Status from UGC

# TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P.)

## PhD PROGRAMME

### SYLLABUS FOR DISCIPLINE-SPECIFIC COURSE

#### COMPUTER APPLICATIONS/

#### COMPUTER SCIENCE & ENGINEERING

Course Code: PDS240138	EDGE COMPUTING AND IoT	L	T	P	C
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<b>Objective:</b>	The objective of this course is to enable students to understand and apply principles of decentralized computing to process data at the network edge, improving efficiency and reducing latency.				
<b>Course Outcomes:</b>	<b>On completion of the course, the students will be:</b>				
<b>CO 1:</b>	Identify the edge computing concept and its application				
<b>CO 2:</b>	Implementation of computation offloading, joint communication, and computation resource management for MEC.				
<b>CO 3:</b>	Analyzing the IoT services and their application				
<b>CO 4:</b>	Applying the mechanism for cloud security and services.				
<b>CO 5:</b>	Demonstrate the concept of edge data analytics and its application				
<b>Course Content:</b>					
<b>Unit 1:</b>	Introduction to Edge Computing and its Architectures, Roles, and Functions of Edge Communication Technologies, Distributed systems and edge computing core concepts, Edge computing such as time ordering and clock synchronization, distributed snapshot, Edge computing interfaces, Edge Computing and data analytics, Core tenets of edge analytics, Edge computing and its solution, Federating Edge Computing, Edge computing and its application.				
<b>Unit 2:</b>	Mobile Edge Computing Basics: Key features of MEC, Mobile computing; Computation task models; Virtual machine; CPU/GPU computing platforms, Computation Offloading: Different offloading modes; single-user offloading, multi-user offloading, Mobile Edge Computing network architecture; Standardization of MEC in 5G; Security and privacy issues in MEC.				
<b>Unit 3:</b>	IoT and Edge Computing: use cases and deployment: IoT Architecture and Core IoT, IoT and Edge Security, Physical and hardware security, Shell security, Collaborative and Integrated Edge Security Architecture, Smart city IoT, Applications of Edge Networks in Healthcare Internet of things, Introduction to IoT Edge platforms such as Azure IoT hub, AWS IoT platform,				
<b>Unit 4:</b>	Introduction to Edge cloud architectures, Lightweight Edge Clouds, the Cloud Computing analytics pipeline, Coordination of Cloud Services. Server less Computing and FaaS Model, Cloud-Fog-Edge enabled Analytics, Cloud edge security, Case Studies and Recent Advancements, Predictive analysis for Fog applications deployment.				
<b>Unit 5:</b>	Introduction to edge data analytics, Edge data analytic architecture and functionality, Introduction to big edge data analytics and AI data analytics, Data Security practice in edge computing, Big Data protection by design AI edge computing, AI edge computing Tools for Data Mining and Analysis. Application of edge data analytics in industry. Applications of edge data analytics in Healthcare and Medical,				

**Text Books:**

1. Jie Cao, Quan Zhang, Weisong Shi, “Edge Computing: A Primer” SpringerLink in Science
2. Vignesh Prajapati, ”Big Data Analytics with R and Hadoop”, PACKT Publishing, November 2003
3. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, “Cloud Computing: Principles and Paradigms” Wile publication, 2011