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: PDS240134	**BLOCK CHAIN ARCHITECTURE**	**L**	**T**	**P**	**C**
		0	**0**	**0**	**4**
Objective:	The primary objective of this course is to provide a comprehensive understanding of blockchain technology, its underlying principles, and its applications.				
Course Outcomes:					
CO 1:	Understand the core cryptographic primitives used in blockchain technology.				
CO 2:	Comprehend the concept of smart contracts and their role in blockchain applications.				
CO 3:	Explore the evolution of blockchain technology, including Blockchain 2.0 and 3.0.				
CO 4:	Identify the potential applications of blockchain technology beyond cryptocurrencies.				
CO 5:	Critically analyze the strengths and limitations of different blockchain platforms.				
Course Content:					
Unit 1:	Basic Cryptographic primitives used in Blockchain – Secure, Collison-resistant hash functions, digital signature, public key cryptosystems, zero-knowledge proof systems. Basic Distributed System concepts – distributed consensus and atomic broadcast, Byzantine fault tolerant consensus methods				
Unit 2:	Basic Blockchain (Blockchain 1.0) – concepts germane to Bitcoin and contemporary proof-of-work based consensus mechanisms, operations of Bitcoin blockchain, and crypto-currency as the application of blockchain technology.				
Unit 3:	Blockchain 2.0 – Blockchains with smart contracts and Turing complete blockchain scripting – issues of correctness and verifiability, Ethereum platform and its smart contract mechanism.				
Unit 4:	Blockchain 3.0 – Plug-and-play mechanisms for consensus and smart contract evaluation engines, Hyperledger fabric platform.				
Unit 5:	Beyond Cryptocurrency – applications of blockchain in cyber security, integrity of information, E-Governance, and other contract enforcement mechanisms. Research directions in Blockchain technology				
Textbooks:	**1.** Andreas Antonopoulos "Mastering Bitcoin Unlocking Digital Cryptocurrencies" O'Reilly publication. **2.** Imran Bashir "Mastering Blockchain: Distributed ledger technology, decentralization", Packt publishing.				
Reference Books:	**1.** Wattenhofer, The Science of the Blockchain **2.** Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction" Princeton University.				
Additional Electronic Reference Material:	NPTEL :: Computer Science and Engineering - NOC: Blockchain Architecture Design and Use Cases				