



CENTRAL UNIVERSITY OF KASHMIR
Department of Information Technology
Tulmulla, Ganderbal

Programme: M.Tech. CSE

Semester: 3rd

Subject: Blockchain

CourseCode: MTCS-E-042

UNIT I:

Introduction to Blockchain technology: Why, What, How. Distributed vs Centralized Architecture. DLT (Decentralised ledger Technology), Need of Decentralised Ledger system, advantages of DLT, Issues of a Decentralized System, Blockchain Architecture.

UNIT II:

Cryptographic Elements in Blockchain: Cryptographic primitives. Public-key Infrastructure (PKI), Elliptic Curves, Digital Signature & Secure Hash Algorithms, Discrete Logarithmic Problem (DLP), Elliptic Curve Diffie Helman (ECDH), Elliptic Curve Digital Signature Algorithm (ECDSA), Zero-Knowledge Proof Systems

UNIT III:

Blockchain Platforms, Classification, Ethereum, EVM, Consensus Algorithms: Nakamoto Consensus , BFT (Byzantine Fault Tolerance), PoW, PoS, PoA etc., security, attacks, sybil resistance.

UNIT IV:

Smart Contracts, Programming in Solidity, data types, functions, access modifiers, access control.

UNIT V:

Cryptocurrencies: Bitcoin, Tokens. Wallets: managing and protecting crypto assets.

Blockchain applications in real life, Use-cases: DeFi, Healthcare, dApps.

Introduction to NFTs, Inter Planetary File System (IPFS)

Books:

- “Mastering Bitcoin” by Andreas Antonopoulos, O’Reilly
- “Blockchain Revolution” by Don and Alex Tapscott
- “The Blockchain Developer” by Elad Elrom , APress
- Blockchain: Blueprint for a New Economy, By Melanie Swan, O’Reilly