

# CRYPTOCURRENCY TECHNOLOGIES

## SYLLABUS

### Module 1: Fundamentals of Cryptocurrency

- Cryptocurrency
- Origin and Importance
- Legal Status
- Usage of Cryptocurrency
- Blockchain Structure
- Interaction Between Blockchain and Cryptocurrencies
- Importance and Uses of Cryptocurrency
- Hardware and Software Requirements of Blockchain

### Module 2: Functional Aspects of Cryptocurrency

- Bitcoin and Other Cryptocurrencies
- Distributed Consensus and Atomic Broadcast
- Alternatives to Bitcoin Consensus
- Alternative Coins
- Byzantine Fault-Tolerant Consensus Methods
- Blockchain-Based Cryptocurrency and Its Applications
- Technologies Borrowed in Blockchain

### Module 3: Bitcoin Scripting

- Bitcoin Scripting Language and Its Uses
- Transactions
- Signatures
- Pay to Script Hash
- Segregated Witness
- Pay to Multi-Signature
- Storing Data

- Timelocks
- Hash Time-Locked Contracts
- Atomic Swaps
- Payment Channels

## **Module 4: Crypto Primitives for Cryptocurrency**

- Hash Functions
- Puzzle-Friendly Hash
- Collision-Resistant Hash
- Hash Pointers and Digital Signatures
- Public Key Cryptography
- Verifiable Random Functions
- Zero-Knowledge Systems
- Bitcoin Blockchain Interaction
- Elliptic Curve Cryptography in Blockchain
- SHA-256

## **Module 5: Security & Privacy Issues in Cryptocurrency**

- Building a Secure Bitcoin Payment System
- Building a Secure Payment Gateway
- Compiling Bitcoin from Source
- New Cryptocurrency Creation
- Cloning Bitcoin
- Reader Coin Rebranding
- Securing Peer-to-Peer Auctions in Ethereum
- Applications of Blockchain in Cybersecurity

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## **Module 6: Building Own Cryptocurrency**

- Coding Own Cryptocurrency on Ethereum
- Building ERC-20 Token
- Integrity of Information
- E-Governance and Other Contract Enforcement Mechanisms
- Limitations of Blockchain
- Myths vs. Reality of Blockchain Technology

## **Module 7: Future Directions of Cryptocurrency**

- Smart Property
- Efficient Micro-Payments
- Coupling Transactions and Payment (Interdependent Transactions)
- Public Randomness
- Source Prediction Markets
- Escrow Transactions
- Green Addresses
- Auctions and Markets
- Multi-Party Lotteries



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