

# BLOCKCHAIN ARCHITECTURE DESIGN

## SYLLABUS

### Module 1: Fundamentals of Blockchain

- Blockchain: Importance and Features
- Layers of Blockchain: Application Layer, Execution Layer, Semantic Layer, Propagation Layer, Consensus Layer
- Types of Blockchain
- Blockchain in Practical Use Today
- Blockchain Governance Challenges
- Blockchain Technical Challenges

### Module 2: Blockchain for Enterprise

- Blockchain Components and Concepts
- Block Header and Identifiers
- Linking Blocks in the Blockchain
- Mining and Consensus: Aggregating Transactions into Blocks
- Mining the Block
- Validating and Assembling of Blocks
- Selecting Chains of Blocks

### Module 3: Transactions and Bitcoin Network

- Transactions: Lifecycle, Structure, Inputs and Outputs, Standard Transactions
- Bitcoin Network: Network Discovery for a New Node
- Block Propagation

## **Module 4: Bitcoin Client**

- Consensus in Bitcoin: Proof of Work (PoW), Mining the Block, Changing the Consensus Rules
- Bitcoin Core: Bitcoin Core Application Programming Interface
- Running a Bitcoin Core Node
- Alternative Clients, Libraries, and Toolkits
- Bitcoin Addresses: Implementing Keys and Addresses in Python
- Wallets

## **Module 5: Security and Privacy Practices**

- Security Architecture Principles
- Technical and Inherent Risks of Blockchain Technology
- Attacks on Privacy: Blockchain and Non-Blockchain-Based Attacks
- Risks and Limitations of Blockchain
- User Security Best Practices: Physical Bitcoin Storage, Hardware Wallets, Balancing Risk, Diversifying Risk, Multi-Signature and Governance

## **Module 6: Blockchain Architecture and Applications**

- Design Methodology for Blockchain Applications
- Blockchain Application Templates
- Blockchain Application Development
- Ethereum
- Solidity
- Deploying a Sample Application: Blockchain and Betting
- Colored Coins
- Counterparty

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## Module 7: Blockchain Use Cases

- Blockchain in Financial Software and Systems
- Supply Chain and Logistics Monitoring
- Music Royalties Tracking
- Advertising Insights
- Blockchain Implementation for Land Records
- Digital Content Publishing and Selling
- Digital Supply Chain
- Medical Record Management System



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