

BLOCKCHAIN

BEGINNER

5 DAYS

Blockchain for Decentralized Systems

Build enterprise blockchain skills for decentralized systems - from foundations and smart contracts to dApp architecture, Hyperledger Fabric, security audits, and banking use cases.

Why Blockchain?

Enterprise relevance

Understand blockchain use cases for clearing, settlement, reconciliation, audit trails, trade finance, KYC, cross-border payments, and CBDCs.

Security-first learning

Learn smart contract vulnerabilities, key management, multi-signature controls, audit practices, and regulated deployment considerations.

Hands-on capability

Build hash chains, sign messages, deploy smart contracts, connect dApps to wallets, and operate private or consortium networks.

Architecture clarity

Evaluate when blockchain is suitable and make justified technology recommendations for banking and financial use cases.

What you'll be able to do

- ✓ Explain how blockchain technology works and differentiate between blockchain types suitable for enterprise use
- ✓ Design and deploy smart contracts that encode business logic
- ✓ Architect a decentralized application with separated frontend, smart contract, and data layers
- ✓ Set up and operate nodes on a private or consortium blockchain network
- ✓ Apply security best practices to smart contract development and key management
- ✓ Evaluate blockchain suitability for banking and financial use cases and make justified technology recommendations

Who this is for

- Software engineers
- IT infrastructure specialists
- Banking technology teams
- Enterprise architects evaluating decentralized systems
- Complete beginners to blockchain and decentralized systems

Curriculum

01 Blockchain Foundations and Decentralized Systems

- Decentralization, distributed ledgers, and how trust shifts in multi-party systems
- Cryptographic primitives that underpin blockchain integrity
- Consensus mechanisms and platform selection for enterprise contexts
- Public versus private versus consortium network trade-offs
- **Hands-on:** Blockchain explorer lab, hash chain lab, and message signing

02 Blockchain Mechanics, Hashing, Keys, and Consensus

- Block structure, transaction flow, and validation basics
- Hashing, public/private keys, and wallet models
- Proof-of-work and proof-of-stake: how consensus secures networks
- Reading chain data to verify transactions and block integrity
- **Hands-on:** Create test wallets, inspect transactions, and validate block data on a test network

03 Smart Contracts and Solidity Programming

- Smart contract concepts and the EVM lifecycle
- Solidity fundamentals for business logic and state
- Access control patterns and production-ready contract structure
- Using OpenZeppelin building blocks safely
- **Hands-on:** Build and deploy Solidity contracts with Remix, OpenZeppelin, Ganache, and Sepolia

04 Decentralized Application Architecture

- dApp layers: frontend, smart contracts, and data boundaries
- Web3.js and Ethers.js patterns for wallet-connected apps
- On-chain versus off-chain data, indexing, and monitoring
- Node infrastructure considerations for reliable dApp backends
- **Hands-on:** Connect a frontend to deployed smart contracts and execute wallet-based transactions

05 Enterprise Blockchain and Hyperledger Fabric

- Permissioned network topology and consortium operating models
- Chaincode, channels, and private data collections
- Identity management and governance for enterprise networks
- When Hyperledger Fabric fits banking and multi-party workflows
- **Hands-on:** Model an enterprise permissioned blockchain workflow and review Hyperledger Fabric deployment concepts

06 Smart Contract Security and Audit Practices

- Common risks: access control failures, reentrancy, and unsafe defaults
- Token standards and upgradeability considerations
- Layer 2 scaling, interoperability, and ZKP awareness for enterprise designs
- Audit workflows, key management, and multi-signature controls
- **Hands-on:** Analyze ERC-20 deployment risks and run Slither-based contract checks

07 Capstone: Banking Use Cases, Compliance, and Architecture Demo

- Apply blockchain to settlement, reconciliation, audit trails, and asset tokenization
- Map compliance and regulated deployment considerations to architecture choices
- Justify technology recommendations for banking and financial use cases
- **Hands-on:** Deliver a capstone architecture and working demo for an enterprise blockchain use case