



Total Duration 45 DAYS

Ideal Audience

Engineering Students, Faculty Members & Industry Professionals

Delivery Format

Lectures, Labs, Projects, Quizzes, Case Studies

Blockchain Foundations

Objective: Build conceptual clarity for beginners

- ⇒ Introduction to Blockchain
- ⇒ History: Bitcoin Whitepaper & Evolution
- Core Concepts: Blocks, Chains, Nodes, Hashing
- ⇒ Types of Blockchain: Public, Private, Consortium
- ⇒ Consensus Algorithms: PoW, PoS, DPoS, PBFT
- ⇒ Hands-on: Remix IDE Basics

Cryptography & Security

Objective: Understand secure transaction processing.

- ⇒ Cryptographic Hash Functions (SHA-256, Keccak256)
- ⇒ Digital Signatures & Public Key Infrastructure
- ⇒ Wallets & Key Management
- Demo: Creating wallets, signing & verifying transactions

Smart Contracts with Ethereum

Objective: Develop and deploy smart contracts.

- ⇒ Ethereum Overview & EVM
- **⇒** Solidity Language Essentials
- ⇒ Contract Structure, Data Types, Functions, Events
- ⇒ Remix IDE + MetaMask Setup
- ⇒ Error Handling & Debugging
- ⇒ Security Best Practices (Reentrancy, Overflow, etc.)
- ⇒ Hands-on: Simple voting or crowdfunding contract(Homework)



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DApps Development

Objective: Connect smart contracts with web apps.

- ⇒ Web3.js / Ethers.js Integration
- ⇒ Connecting Frontend with Ethereum Smart Contracts
- ⇒ MetaMask Transactions
- ⇒ Building a Basic DApp: Token wallet or NFT Viewer
- ⇒ Hosting DApps on IPFS or Fleek

Advanced Blockchain Concepts

Objective: Cover advanced topics for experienced learners.

- ⇒ Layer 1 vs Layer 2
- ⇒ Rollups: ZK & Optimistic
- ⇒ Polkadot, Cosmos
- ⇒ Oracle Networks: Chainlink
- ⇒ Zero Knowledge Proofs (ZKPs)
- ⇒ Hands-on: Layer 2 Deployment (e.g., Polygon, Arbitrum)





Blockchain Use Cases & Platforms

Objective: Explore real-world applications

- ⇒ Supply Chain & Provenance
- DeFi: Lending, DEXs, Staking
- ⇒ NFTs & Metaverse
- ⇒ Real Estate Tokenization (From MetaWeb3 use-case!)
- ⇒ Healthcare, Voting, Identity Management
- ⇒ Hyperledger Fabric vs Corda

Token Standards & Tokenomics

Objective: Understand tokens and economy design

- ⇒ ERC Standards: ERC-20, ERC-721, ERC-1155
- ⇒ Fungible vs Non-Fungible Tokens
- ⇒ Token Creation, Minting & Burning
- ⇒ Token Economics: Utility, Governance, Security Tokens
- ⇒ Hands-on: Launch a token on testnet
- ⇒ Intro to DAO (Decentralized Autonomous Organization)



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Industry Projects & Case Studies

Objective: Apply concepts in real projects

- ⇒ Mini Projects:
 - a. NFT Marketplace
 - b. Real Estate Tokenization Platform (MetaWeb3)
 - c. DAO for Student Governance
- ⇒ Industry Case Studies: Uniswap, Aave, OpenSea, Helium
- ⇒ Capstone Project Kick-off
- ⇒ Version Control with Git + GitHub (for Blockchain projects)

Tools, DevOps & Career Pathways

Objective: Get industry-ready

- ⇒ Hardhat
- ⇒ Alchemy/Infura Setup
- ⇒ CI/CD for Smart Contracts
- ⇒ Security Audits & Tools (MythX, Slither, OpenZeppelin)
- ⇒ Career Roles: Blockchain Architect, Smart Contract Dev, Auditor
- ⇒ Resume + LinkedIn Tips for Web3 Jobs

Final Capstone Presentations & Evaluation

Objective: Validate knowledge through demos

- ⇒ Group Capstone Demos
- ⇒ Viva/Presentation
- ⇒ Assessment (MCQ, Hands-on)
- ⇒ Certification Distribution
- ⇒ Feedback & Future Roadmap Discussion





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