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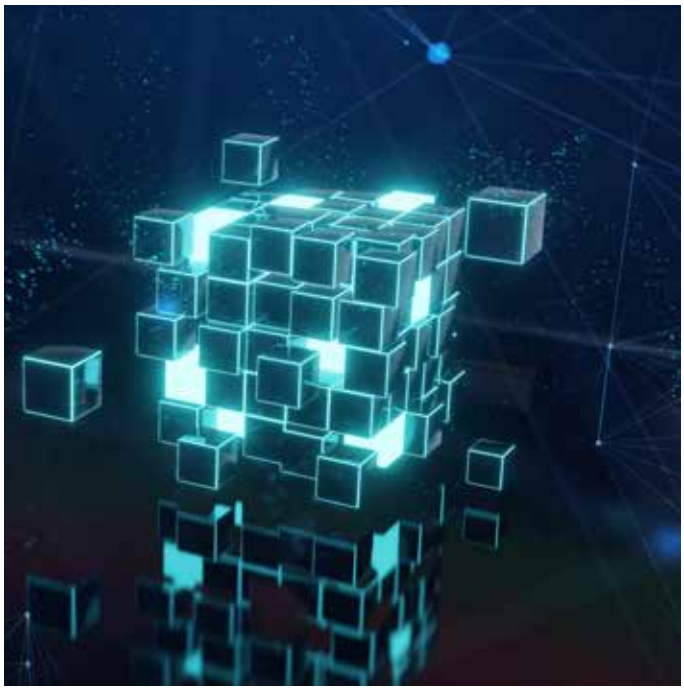
CERTIFICATE IN BLOCKCHAIN

Certificate In Blockchain



About the Certificate

The Blockchain Technology Certification Program is a comprehensive and dynamic course designed to equip learners with a deep understanding of blockchain technology, its applications, and its implications across various industries. This certification program integrates a series of courses that cover a broad range of topics, including programming in Ethereum, Web 3.0 decentralised application development, the role of security in public blockchain, DeFi application development, and private blockchain in Hyperledger Fabric.

Key Features of the Certificate

Diverse Curriculum: Covering fundamental concepts to advanced applications in blockchain technology, including Ethereum programming, DeFi, NFTs, blockchain security, and private blockchain development.

Hands-On Learning: Practical exercises, project assignments, and capstone projects enable learners to apply knowledge in real-world scenarios.

Expert Instruction: Courses are taught by seasoned professionals and experts in the blockchain field.

Flexible Learning Path: The program is designed to accommodate learners at various levels, offering video lectures, interactive quizzes, and peer-reviewed assignments.

Career Advancement: Prepares learners for a wide range of career paths in blockchain technology, cybersecurity, fintech, and more.

About the Certificate

Our Blockchain Certificate Program serves as a comprehensive platform for those aiming to master blockchain technology, start or upskills their careers in it, covering critical areas such as Ethereum programming, Web 3.0, DeFi (Decentralised Finance), NFTs (Non-Fungible Tokens), blockchain security, and the application of private blockchains using Hyperledger Fabric. BGSA is a leading organisation dedicated to setting the benchmarks for excellence and integrity in the blockchain industry.

This certification has been carefully crafted for both newcomers and seasoned professionals aiming to enhance their knowledge and abilities in blockchain technology, smart contracts, DeFi applications, among others, thus expanding their career opportunities in the rapidly evolving domain of blockchain and digital assets.This certification also provides a profound knowledge and job based and practical skills in blockchain technology

Upon completing this certificate, learner will:

- Attain a certificate from Al Nafi: After successfully completing the coursework and assessments, learners will be awarded an Al Nafi certificate, a symbol of your accomplishment and expertise.

- Join the Al Nafi Alumni Community: You'll become eligible for Al Nafi Alumni membership, connecting you with a network of like-minded professionals and offering continued support and opportunities for your career advancement.

1.1 Enhance Your Career with Specialized Blockchain Certification

This exclusive opportunity is available only when learners combine this blockchain certification with any diploma endorsed by EduQual, thereby turning it into a specialisation. By opting for this blend, learners can significantly enhance their credentials, unlocking unique career advancement opportunities and gaining access to worldwide employment prospects. The following benefits are reserved for those who embark on this journey and are contingent upon the integration of the certification with an EduQual endorsed diploma:

- Pairing this certificate with a diploma will earn learners both an EduQual endorsed diploma and a certificate from Al Nafi, showcasing their specialised skills.
- Successful completion of the EduQual exams and all related assessments within the specialisation grants access to the Al Razzaq Program. This program offers additional professional development opportunities, enhancing learners' growth prospects.
- Participants will receive an upgraded resume and an internship certificate upon finishing all assessments and coursework pertinent to their certificate and specialisation, further bolstering their employability.
- The specialisation program provides job assistance for durations of 30, 60, and 90 days, aiding learners in their quest for suitable employment.
- Additionally, learners will have the chance to apply for undergraduate and post-graduate degree programs, leveraging the RQF level of their specialisation to advance their academic pursuits.

This ensures that learners not only gain deep insights and practical skills in blockchain technology but also enhance their career trajectories with valuable credentials and professional support.

1.2 About Al Nafi

Al Nafi, the leading global e-Learning platform, offers rigorous and specialised training in emerging technologies and processes shaping the digital landscape. With a cost-effective, self-paced learning and time-efficient approach, we have served more than 300,000 learners, with numerous alumni excelling in Fortune 500 companies worldwide. Our customised programs are designed to help both individuals and organisations achieve their career and business objectives.

1.3 Program Eligibility Criteria and Application Process:

1.31 How to register for the Certificate

Interested individuals looking to enrol in the Certificate in Blockchain must register for the certificate via the website. Learners can use this link https://alnafi.com/courses/certificate-in-blockchain to submit their application.

1.32 7-day free trial

A 7-day free trial is offered to all prospective learners, allowing them to explore course details and content. Please note, however, that not all content is accessible during the 7-day free trial period.

1.33 Eligibility Criteria

To enrol in the Certificate in Blockchain, there are no specific courses or academic prerequisites required. However, candidates must possess the following:

- A laptop or desktop computer that is in good working order
- A dependable internet connection
- Proficiency in using the internet and the ability to troubleshoot internet-related issues.

1.3.4 Application Process

After selecting the preferred payment plan, learners can begin their studies with ease as the application process comprises only three straightforward steps.

STEP 1

CHOOSE THE PAYMENT METHOD AND PLAN

Fill out the application form and choose your preferred payment plan, which includes options for monthly, quarterly, half-yearly, and annual payments.

STEP 2

SUBMIT THE APPLICATION PROCESS

With just one click, submit your application once you have chosen the payment method and plan.

STEP 3

ADMISSION

Once your payment method and plan have been verified, immediately begin your studies.

1.3.5 Connect with the Support Operations Center

Our dedicated support team is here to assist you with any questions or concerns you may have regarding the application process and related matters, 24/7. They can help you with inquiries regarding

- the application.
- provide information on the easy study program (if applicable)
- clarify any confusion you have about the certificate program.

1.3.6 Program Outcomes

01 **Demonstrate Comprehensive Blockchain Knowledge:** Command a strong understanding of blockchain fundamentals, Ethereum development, DeFi ecosystems, NFTs, and private blockchain technologies.

02 **Hands-on Expertise:** Apply practical skills in developing, deploying, and managing blockchain applications through interactive projects and real-world scenarios.

03 **Career Readiness:** Equip yourself with the skills and credentials to pursue advanced roles in blockchain development, security analysis, project management, and more in a variety of industries.

04 **Academic and Professional Advancement:** Leverage the certification for further educational opportunities or to elevate your standing in the professional blockchain community.

This certification program is an ideal stepping stone for anyone passionate about blockchain technology, offering a clear path to achieving both professional excellence and academic recognition in this cutting-edge field.

1.3.7 Who Should Enrol in this Program?

This Certificate in Blockchain is designed for:

- School, College and university students looking to expand their knowledge, skills, and career opportunities.
- Professionals in the industry who want to enhance their skills and advance their careers.

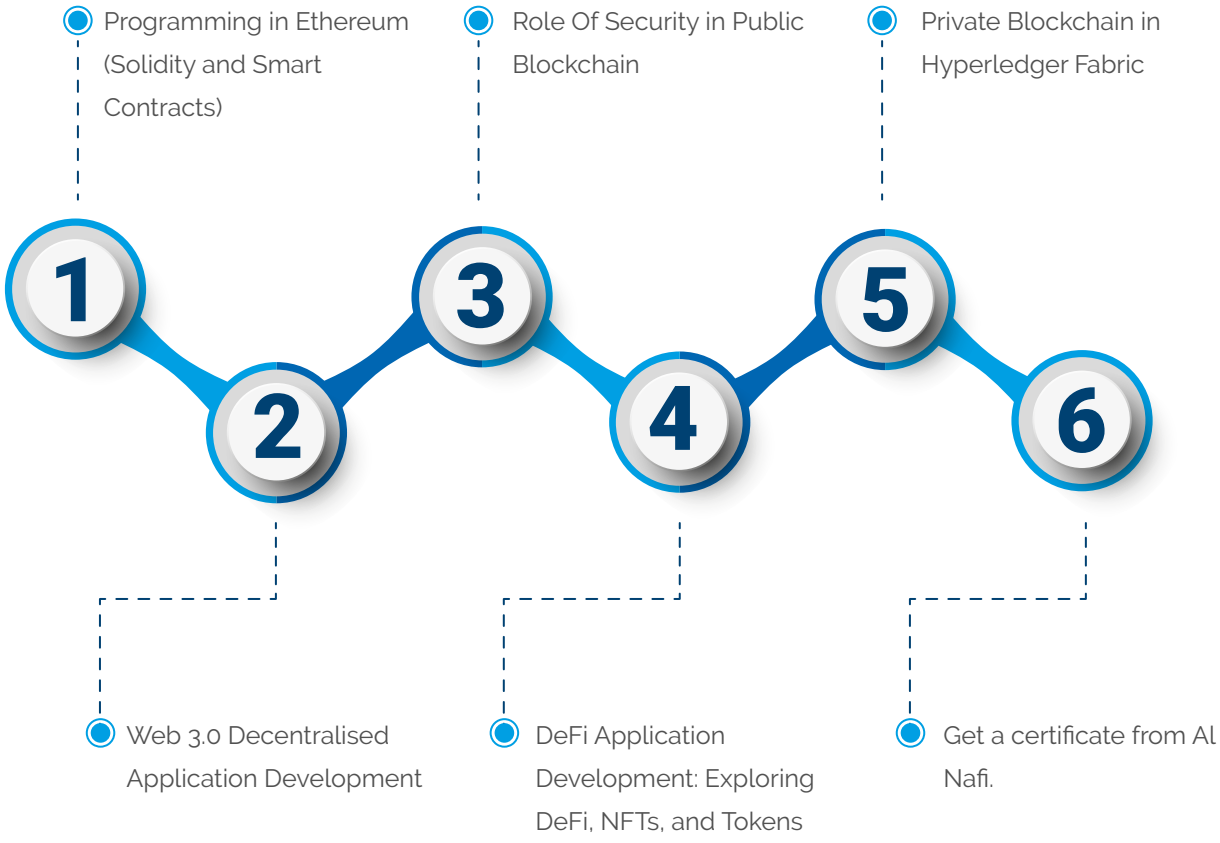
This certificate is suitable for individuals between the ages of 16 and 45 who are self-motivated and capable of studying independently. The diverse student body, composed of individuals from various industries and backgrounds, enriches class discussions and interactions.

1.3.8 Career paths after studying this certificate

1. **Blockchain Developer:** Specialising in creating and implementing decentralised applications and smart contract solutions.
2. **Smart Contract Developer:** Focused on writing, testing, and deploying smart contracts on blockchain platforms like Ethereum.
3. **DeFi Application Developer:** Developing decentralised finance applications to innovate within the financial sector using blockchain technology.
4. **NFT Project Manager:** Managing projects related to the creation, deployment, and marketing of non-fungible tokens.
5. **Blockchain Security Analyst:** Identifying and mitigating security vulnerabilities in blockchain applications and platforms.
6. **Hyperledger Developer:** Developing and managing blockchain solutions for private and consortium blockchains using Hyperledger Fabric.
7. **Blockchain Solution Architect:** Designing blockchain solutions and architecture to meet business requirements.
8. **Ethereum Developer:** Specialising in the development of decentralised applications (dApps) on the Ethereum platform.
9. **Web 3.0 Developer:** Building applications and services for the decentralised web, leveraging blockchain and other decentralised technologies.
10. **Crypto Economist:** Analysing and applying economic principles within the cryptocurrency and blockchain ecosystem.
11. **Blockchain Consultant:** Advising businesses and organisations on how to leverage blockchain technology for innovation and efficiency.
12. **Solidity Developer:** Writing and deploying smart contracts using Solidity, Ethereum's primary programming language.
13. **DApp Developer:** Designing and implementing decentralised applications on various blockchain platforms.
14. **Blockchain Project Manager:** Overseeing blockchain projects from conception through to implementation and evaluation.
15. **Crypto Compliance Analyst:** Ensuring that blockchain and crypto projects comply with regulatory standards and practices.
16. **Decentralised Identity Developer:** Working on blockchain-based solutions for secure and sovereign digital identities.

These roles are representative of the diverse career paths available to graduates of a comprehensive blockchain technology certification program, reflecting the vast potential for professional application in various sectors including finance, technology, healthcare, and more.

1.3.9 Learning Path



1.3.10 Programming in Ethereum (Solidity and Smart Contracts)

The course "Programming in Ethereum (Solidity and Smart Contracts)" is designed to provide an in-depth understanding of Ethereum, one of the leading platforms for decentralised applications (DApps) and smart contracts. This course is meticulously crafted to guide learners through the fundamentals of blockchain technology, with a specific focus on the Ethereum ecosystem. Through a blend of theoretical knowledge and practical exercises, participants will learn to develop, deploy, and interact with smart contracts using Solidity, Ethereum's native programming language. The curriculum emphasises the architectural nuances of the Ethereum blockchain, including its virtual machine (EVM), consensus mechanisms, and the development tools and frameworks essential for building DApps. By the end of this course, learners will possess the skills necessary to contribute to the Ethereum blockchain ecosystem, innovate with decentralised applications, and understand the economic principles underlying the crypto economy.

Key Learning Objectives

Upon completing this course, learners will be proficient in the following key areas:

1. Understand the principles and architecture of blockchain technology, focusing on the Ethereum ecosystem.
2. Develop and deploy smart contracts using Solidity, with a deep understanding of its syntax and functionalities.
3. Master the use of Ethereum Virtual Machine (EVM) and its role in executing smart contracts. Utilise development tools and frameworks such as Truffle, Ganache, and Hardhat for building and testing DApps.
4. Understand the mechanisms of Ethereum's consensus, including Proof of Work (PoW) and Proof of Stake (PoS), and the transition to Ethereum 2.0.
5. Gain insights into the economic models of gas fees, tokenomics, and the broader crypto economy.
6. Apply best practices for secure smart contract development to prevent common vulnerabilities and exploits.
7. Explore the future of decentralised finance (DeFi) and non-fungible tokens (NFTs) within the Ethereum ecosystem.

Course Curriculum

Introduction to Blockchain and Ethereum: Understanding the basics of public blockchains and the history of Ethereum.

Ethereum Blockchain Network: Deep dive into Ethereum's architecture, including smart contracts, Ethereum accounts, and Ether cryptocurrency.

Ethereum Programming: Learn to program smart contracts with Solidity, covering data types, control structures, and advanced features.

Development Environment Setup: Setting up the development environment with tools like Truffle, Ganache, and Metamask.

Smart Contract Development: From writing your first smart contract to deploying and interacting with it on the Ethereum network.

Advanced Ethereum Features: Exploring advanced concepts like the Ethereum Virtual Machine (EVM), gas optimization, and security practices.

DApp Development: Building decentralised applications on Ethereum, understanding their architecture, and connecting them with web interfaces.

Deployment and Testing: Deploying contracts on test networks, using Ethereum testnet, and understanding blockchain explorers like Etherscan.

Ethereum 2.0 and Beyond: An overview of Ethereum 2.0, including the Beacon Chain, shard chains, and the transition to Proof of Stake (PoS).

Units Outline

Assessment Approach

The course incorporates a comprehensive assessment strategy to ensure learners' understanding and ability to apply their knowledge. Assessments will include:

This approach aims to provide a holistic understanding of Ethereum programming, enabling learners to confidently navigate the blockchain development landscape.

1.3.11 Web 3.0 Decentralised Application Development

This meticulously designed course, "Web 3.0 Decentralised Application Development," introduces learners to the futuristic landscape of Web 3.0 and its cornerstone, decentralised applications (DApps). As the digital world shifts from centralised data control to a distributed network model, understanding the intricacies of decentralised technologies has become indispensable. This course aims to bridge the knowledge gap by offering comprehensive insights into the creation, deployment, and management of DApps, leveraging blockchain technology. Participants will be immersed in practical exercises and theoretical knowledge, equipping them with the skills needed to navigate and contribute to the Web 3.0 ecosystem. The curriculum emphasises the architectural differences between centralised, distributed, and decentralised networks, the Ethereum blockchain, smart contract development, and the integration of IPFS for decentralised storage. By the end of the course, learners will be adept at developing robust DApps, understanding their implications in various sectors, and preparing for the decentralised future.

Key Learning Objectives

Participants will achieve proficiency in the following areas by completing this course:

- Grasp the foundational concepts of centralised, distributed, and decentralised networks and their significance in the Web 3.0 paradigm.
- Develop a comprehensive understanding of decentralised applications (DApps) and their ecosystem, including their architecture, development, and deployment.
- Master the Ethereum blockchain stack, including smart contracts, the Solidity programming language, and the Ethereum Virtual Machine (EVM).
- Gain hands-on experience with Web3 technologies, MetaMask, Truffle, Ganache, and IPFS, through practical exercises and projects.
- Learn about the potential use-cases of DApps in various sectors such as supply chain, voting/elections, and real estate, highlighting the transformative impact of blockchain technology.
- Understand the limitations, ethical considerations, and best practices in the development and deployment of decentralised applications.

Course Curriculum

- Introduction to Web 3.0 and Decentralised Applications: A primer on the evolution from centralised to decentralised web, introducing the core concepts of Web 3.0 and DApps.
- Fundamentals of Blockchain Technology: Understanding the blockchain technology that underpins DApps, including Ethereum, smart contracts, and the decentralised ecosystem.
- Developing Smart Contracts: Step-by-step guides to developing, testing, and deploying smart contracts using Ethereum, Solidity, and development tools like Truffle and Ganache.
- Frontend and Backend DApp Development: Comprehensive coverage on building the user interface and backend for DApps, integrating with blockchain networks through Web3.js and other libraries.
- IPFS for Decentralised Storage: Exploring IPFS (Interplanetary File System) for decentralised file storage, ensuring data permanence and efficiency in DApps.
- Advanced DApp Development: Delving into complex DApp development scenarios, including integrating decentralised storage, handling transactions, and ensuring security and privacy.
- Real-World DApp Projects: Hands-on projects focusing on real-world applications of DApps in various industries, reinforcing learning through practical application.
- Emerging Trends and Future Directions: A look into the future of Web 3.0, discussing upcoming trends, potential challenges, and opportunities in the decentralised web landscape.

Units Outline

1- Chapter#1 Centralized Apps and World
2- Concept of Centralized World
3- Centralized Controlled Applications
4- Difference between Centralized, Distributed and Decentralized
5- Centralized, Distributed and Decentralized Network
5.1- Quiz 1
6- Chapter#2 The Rise of Decentralized Apps
7- What is DAPP?
8- The fundamentals of DAPP
9- DAPP Eco-System and Flow
10- Types of Decentralized Applications
11- Intermediaries In Ecosystem
12- Existing Intermediaries Issues
13- Examples of Intermediaries
14- Central Governance in the Ecosystem with intermediaries
14.1- Quiz 2
15- Chapter#3 - DAPP Use-Cases
16- Supply Chain Use-Case
17- Election / Voting Use-Case
18- Real estate Use-Cases
19- Do not use DAPP if?
19.1- Quiz 3
20- Chapter#4 - Web3 Technologies (Setup DAPP Pre-requisites)
21- What is Web3 ?
22- Comparison between Web2 and Web3
23- Web3 Limitations
24- Ethereum Stack
25- DAPP Architecture
26a- Web3 Wallet MetaMask
26b- Send / Receive Fake ETHERS using MetaMask and Alchemy (Test transaction exercise)
26c- Connect MetaMask with Truffle Develop Console (Test Transaction Exercise)
26d- Connect MetaMask with Ganache Accounts (Test Transaction Exercise)
26e- Ganache Installation
27a- Nodejs Exercise Intro

Comprehensive Assessment Approach

The course incorporates a multi-faceted assessment strategy to ensure a deep and thorough understanding of the material:

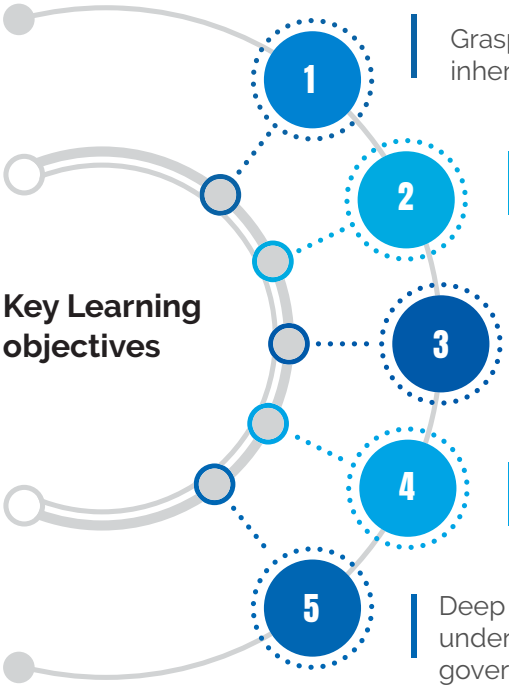
- Quizzes and Exercises: Regular quizzes and hands-on exercises to reinforce key concepts and practical skills.
- Project Assignments: Real-world projects that require applying knowledge and skills to develop functional DApps, addressing genuine problems.
- Peer Reviews: Opportunities for learners to evaluate each other's work, providing constructive feedback and fostering a collaborative learning environment.
- Final Assessment: A comprehensive project that encompasses all aspects of the course, demonstrating the learner's ability to develop and deploy a complete DApp solution.

1.3.12 Role Of Security in Public Blockchain

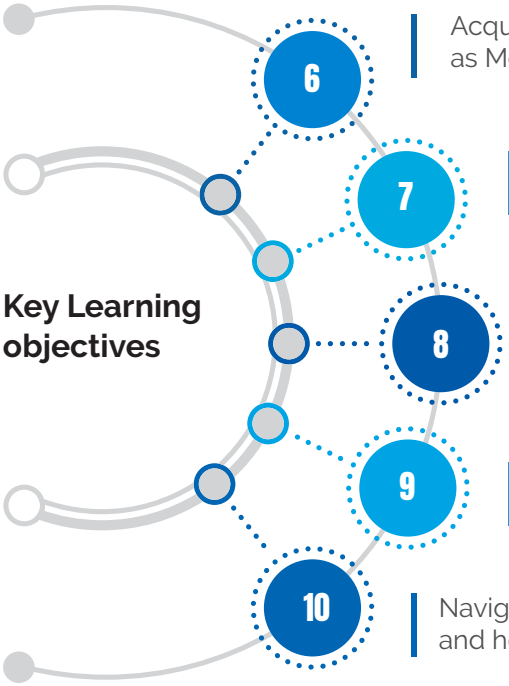
The course "Role Of Security in Public Blockchain" provides a comprehensive deep dive into the critical importance of security mechanisms within the ecosystem of public blockchains. This meticulously structured course is designed to offer participants a profound understanding of the multifaceted security challenges and solutions pertinent to public blockchain technologies. It navigates through the intricate aspects of security in communication, computation, wallet security, smart contracts, and user interactions within the public blockchain sphere. By engaging with real-world scenarios, such as the DAO hack case study, participants will gain insights into historical security breaches and the resultant evolution in blockchain security practices. The course also encompasses hands-on exercises, including unit testing of smart contracts and implementing security patterns, to equip learners with practical skills in safeguarding blockchain projects. Emphasising the critical role of oracles and the nuances of contract best practices, this course ensures a holistic perspective on blockchain security. Upon completion, participants will be adept at identifying and mitigating security vulnerabilities in public blockchain applications, contributing to the development of more secure and resilient blockchain systems.

Key Learning Objectives

Upon completing this course, learners will be proficient in the following key areas:



1. Grasp the foundational principles of public blockchain technology and its inherent security challenges.
2. Understand the scope and importance of security within public blockchain ecosystems, including communication, computation, and wallet security.
3. Gain expertise in smart contract security, learning to identify and mitigate vulnerabilities.
4. Master the principles of user security, including the effective use of mnemonic phrases and private key management.
5. Deep dive into the history and lessons learned from The DAO hack, understanding the implications of such breaches on blockchain technology and governance.



6. Acquire practical skills in unit testing of smart contracts, employing tools such as Mocha, Chai, and Hardhat to ensure code reliability and security.
7. Explore contract best practices, including error handling, avoiding state changes in external calls, and secure development recommendations.
8. Learn through practical exercises, enhancing security through patterns such as Re-Entrancy, Access Restriction, and State Machine, among others.
9. Understand the role of oracles in blockchain, how they retrieve external data, and the security considerations involved.
10. Navigate advanced topics like fallback and receive functions, upgrade patterns, and how to use external data sources securely within smart contracts.

Course Curriculum:

Welcome to the Course - An introduction to the significance of security in public blockchains.

Understanding Public Blockchain Security - Fundamental concepts of blockchain security.

Security Scope - Inside Public Blockchain - Detailed exploration of internal security mechanisms.

Communication, Computation, and Wallet Security - In-depth analysis of key security domains.

Smart Contract and User Security - Strategies for securing smart contracts and user interactions.

The DAO Hack Story - A comprehensive study on the DAO hack and its aftermath.

UNIT TESTING Of Smart Contract - Practical exercises in smart contract testing.

Contract Best Practices - Guidelines for developing secure smart contracts.

Security Patterns - Learning and applying security patterns to prevent attacks.

Contract Best Practices & Oracles - Advanced practices and integrating external data securely.

Fallback and Received Solidity Functions - Handling unexpected transactions and data.

Upgrade Patterns - Ensuring smart contracts remain secure and up-to-date over time.

1- CHAPTER#1 Understanding Public Blockchain Security
2- Security Scope - Inside Public Blockchain
3- Communication Security
4- Computation Security (Lack of Zero Knowledge)
5- Wallet Security
6- Smart Contract Security
7- User Security - Mnemonic Phrase / Seed Phrase / Seed Words
8- MetaMask exercise using Mnemonics and importing private keys
9- CHAPTER#2 - The DAO Story Intro
10- What is Decentralised Autonomous Organization (DAO)
11- The DAO Hack Story : (Part-1) An attack that has changed the Ethereum
12- The DAO Hack Story : (Part-2) The Soft-Fork
13- The DAO Hack Story : (Part-3) The Hard-Fork
14- Result of the Hack and Fork
15- CHAPTER#3 - UNIT TESTING Of Smart Contract
16- Unit Testing in Mocha and Chai
17- Unit Testing Exercise Part-1
18- Unit Testing Exercise Part-2
19- Unit Testing Exercise Part-3
20- Unit Testing Exercise Part-4
21- HARDHAT Unit Testing Exercise (1 HOUR) : UPDATED
21.1- Github Source
22- CHAPTER#4 - Contract Best Practices
22.1- Traditional vs Blockchain - Don't compare with existing languages and trends
23- Be ready for any failure
24- Simplicity and readable
25- Secure Development Recommendations
26- Avoid State Change in External call
27- Handle errors in external calls
28- Don't delegate call to untrusted code
29- Best Security Links for Ethereum
30- CHAPTER#5 - Security Patterns
31- Re-Entrancy Attack and Checks-Effects-Interactions pattern
32- Remix Exercise - Checks-Effects-Interactions pattern
33- Restricting Access Pattern (Modifiers and Functions)
34- Time Based Restriction
35- Time Based Restriction - Remix Exercise

36- Cost Based Restriction
37- Cost Based Restriction - Remix Exercise
38- Account Based Restriction
39- State Machine Pattern
40- State Machine Pattern - Remix Exercise
41- Circuit Breaker Pattern
42- Speed Bump Pattern
43- Ownable Pattern
44- Self Destruct
45- Self Destruct - Remix Exercise
46- View functions and Gas Limits
46.1- Github Source
47- CHAPTER#6 - Contract Best Practices
48- What is Oracle - (Refresh Oracle Understanding)
49- How Oracle retrieves data from the outside world?
50- Oracle Service Provider - Introducing "Provable"
51- Oracle Sample Code - How to get data from JSON based URL
52- Retrieve ETH/USD Price using API inside Smart Contract (Provable Oracle)
53) Retrieve IPFS Data inside Smart Contract (Provable Oracle)
54- Retrieve World Data like city temperature inside Smart Contract (Provable Oracle)
55- Query Status (Provable Oracle)
56- Oracle Service Provider - Introducing "Chainlink"
57-Intro Architecture (Chainlink Oracle)
58-Acquire LINK Tokens in your Wallet (Chainlink Oracle)
59-Retrieve BTC/ETH Price using DataFeed Smart Contract (Chainlink Oracle)
60- Retrieve Single Word using URL API inside Smart Contract (Chainlink Oracle)
61- Retrieve Multi Values using API inside Smart Contract (Chainlink Oracle)
62-Retrieve IPFS Binary Image Data using API inside Smart Contract (Chainlink Oracle)
62.1- Github Source
63- CHAPTER#7 - Fallback and Received Solidity Functions
63.1- Introduction to Fallback Function
64- Ways to fallback function
65- Fallback function - Exercise Part-1
66- Fallback function - Exercise Part-2
67- Introduction to Receive Function
68- Receive Function - Exercise
68.1- Github Source
69- CHAPTER#8 - Upgrade Patterns

69.1-Registry Pattern Introduction
70- Registry Pattern - Exercise
71-Registry Pattern Limitation
72- Eternal Storage Pattern Introduction
73- Eternal Storage Pattern- Exercise Part-1
74-Eternal Storage Pattern-Exercise Part-2
75- Eternal Storage Limitation and upgrade links
75.1- Github Source
75.2- Important Links
75.3- Chainlink
76- CHAPTER#9 - The End

Comprehensive Assessment Approach

Our course employs a robust and diversified assessment methodology to confirm the depth of understanding and proficiency in blockchain security:

- Quizzes and Practical Exercises: To solidify foundational knowledge and hands-on capabilities, participants will complete periodic quizzes and engage in practical security exercises throughout the course.

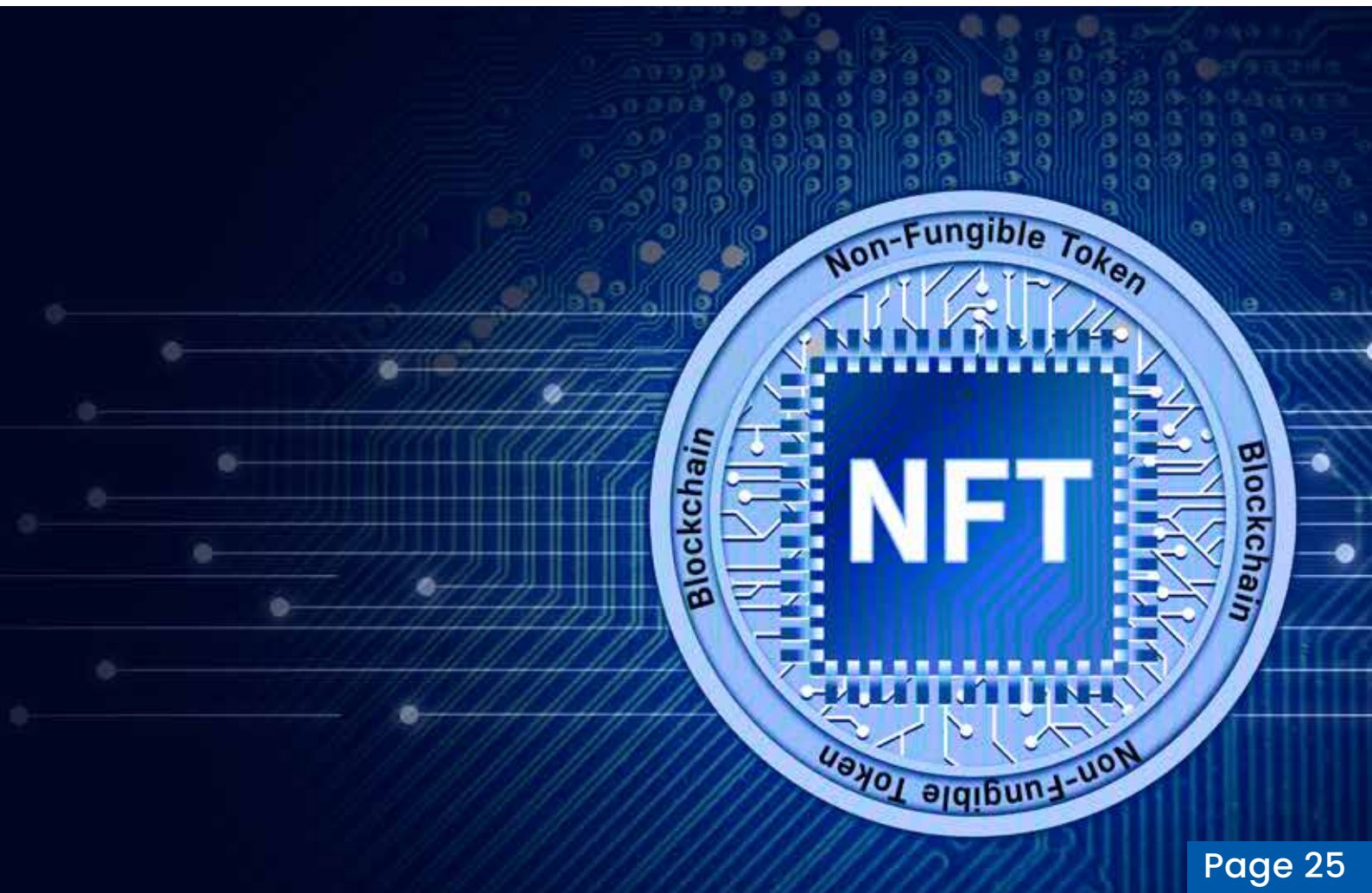
- Peer-Reviewed Assignments: For key sections of the curriculum, learners will submit assignments that are critically reviewed by peers. This process encourages the application of security principles to hypothetical but realistic scenarios, enhancing learning through collaborative feedback.

- Capstone Project: The course culminates in a comprehensive capstone project. Here, participants are tasked with conducting a security audit of a public blockchain system. They will identify vulnerabilities, assess potential security breaches, and formulate strategic enhancements to bolster the system's security framework. This project serves as both an evaluative tool and a preparatory experience, equipping learners with real-world skills essential for navigating the complexities of blockchain security in a professional context.

This multi-layered assessment approach ensures that learners not only understand theoretical concepts but are also adept at applying them practically, thereby preparing them for the challenges and opportunities in the field of blockchain security.

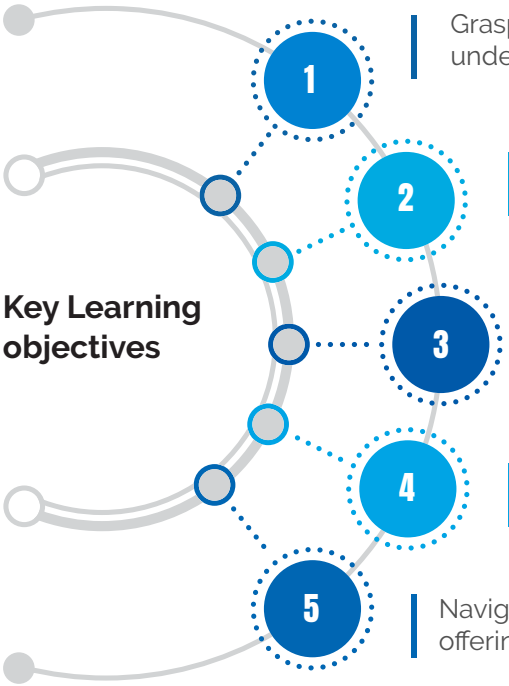
1.3.13 DeFi Application Development: Exploring DeFi, NFTs, and Tokens

The course "DeFi Application Development: Exploring DeFi, NFTs, and Tokens" is designed to offer an exhaustive overview of the decentralised finance (DeFi) ecosystem, including non-fungible tokens (NFTs) and token standards. This program is structured to navigate through the intricacies of cryptocurrencies, the philosophy underpinning them, and the evolution of digital assets over time. By dissecting key components such as tokenomics, ICOs, STOs, and the mechanics behind DeFi protocols, learners will acquire a robust understanding of the decentralised web. The course delves into practical applications by introducing token development on Ethereum, exploring NFT token standards, and demonstrating the creation and deployment of tokens. With a focus on hands-on exercises, participants will engage in real-world scenarios to develop, deploy, and manage digital tokens, understand the dynamics of exchanges, and grasp the significance of liquidity pools in the DeFi space. Upon completion, students will have a comprehensive toolkit to innovate within the DeFi ecosystem, leveraging Ethereum and other blockchain technologies for developing decentralised applications.

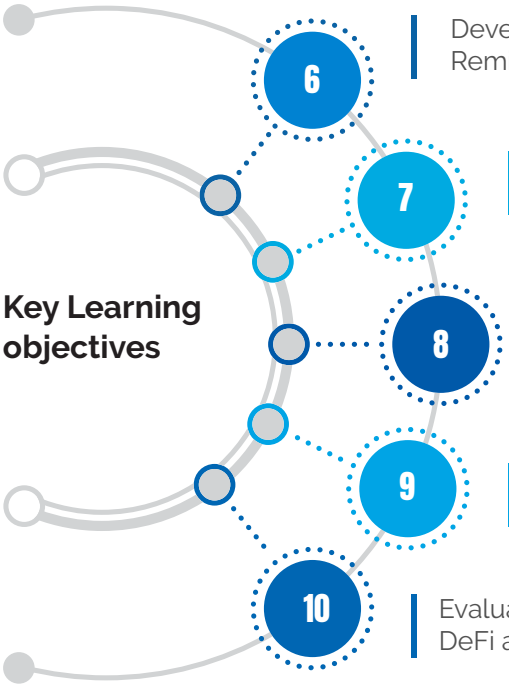


Key Learning Objectives

Upon completing this course, learners will be proficient in the following key areas:



1. Grasp the foundational concepts of cryptocurrencies and their philosophical underpinnings.
2. Understand the history and evolution of money and digital currencies.
3. Explore the principles of tokenomics and their significance in the crypto economy.
4. Differentiate between various token standards, including ERC-20 for fungible tokens and ERC-721 for non-fungible tokens.
5. Navigate the processes involved in initial coin offerings (ICOs), security token offerings (STOs), and initial exchange offerings (IEOs).



6. Develop and deploy tokens on the Ethereum blockchain, utilising tools such as Remix, Truffle, and OpenZeppelin.
7. Analyse and engage with decentralised exchanges (DEXs) and centralised exchanges (CEXs), understanding their mechanics and implications for liquidity.
8. Create and manage liquidity pools within the DeFi ecosystem.
9. Undertake comprehensive projects in token and NFT development, showcasing the ability to innovate within the DeFi space.
10. Evaluate and apply governance models in the context of token projects and DeFi applications.

Course Curriculum:

The curriculum is structured to provide a detailed exploration of DeFi, NFTs, and tokens through a series of video lectures, practical exercises, and quizzes. Key chapters include:

- DEFI Course Introduction
- The Philosophy of Crypto Currencies
- The Evolution of Value: History of Money
- Introduction to Cryptocurrencies and Key Milestones
- Tokenomics and Its Impact on the Crypto Economy
- Deep Dive into Tokens, ICOs, and STOs
- Ethereum NFT and FT Tokens: Standards and Development
- Exchanges, CEX/DEX, and Liquidity Pools
- Token Development on Ethereum (ERC-20 and ERC-721 Standards)
- Advanced NFT Concepts: Minting Processes and Marketplaces
- DeFi Protocols and Building Blocks
- Stablecoins: Types, Examples, and Their Mechanisms
- Token Projects & Governance: Implementing Effective Strategies

Course Outline

1- Chapter# 0- DEFI Course Introduction
2- Course Pre-requisites
3- Chapter#1 - The philosophy of Crypto Currencies
4- History of Money - The Evolution of Value
5- Interesting Gigantic Coin - An Island called “Yap”
6- Cryptocurrencies
7- Bitcoin Pizza Day
8- Bitcoin Price History
9- How bitcoin price determined ?
10- Bitcoin Halving - How it works?
11- Crypto Features
11.1- Quiz # 1
11.2- References:
12- Chapter#2 The Tokenomics - A Crypto Shift
13- What is Economics ?
14- What is Token?
15- What is Tokenomics ?
16- Why you should care about Tokenomics?
17- Significance of Value in Token Economics
18- How US Dollars Enjoy Its Value?
19- Token vs Crypto
20- Ethereum Chain and Binanace Chain
21- Forked Chain Token and Original Token
22- Reference Links:
22.1- Quiz # 2
23- Chapter#3 - Tokens, ICO and STOs
24- The type Layer of Token
25- Security Token Vs Utility Token (Token Classifications)
26- Security and Utility Token in Ethereum
27- What is ICO/ITO?
28- What is STO?
29- Launch ICO (Utility Token)
30- Launch STO (Security Token)
31- What is IEO (Initial Exchange Offering)

61- Exercise 3: Preset ERC20 with Setup Uniswap Liquidity Pool and Creating FHK Token (Using Truffle)

62- References

63- Code Examples

64- Assignment 1: Write your ERC-20 token and upload that on the SEPOLIA Network (Share us its information)

65- Chapter#7 - NFT Token Development (ERC-721)

66- ERC 721 Token Standard

67- CryptoKitties an example of ERC-721 token

68- Explore CryptoKitties

69- NFT in Pakistan

70- NFT in the Meme World

71- NFT and Arts

72- NFT option inside Twitter Profile

73- Twitter Profile NFT Demo (Sneak Peak)

74- Marketplace of NFT Assets

75- Opensea, Solanart, Axie infinity

76- Token API's and Methods (ERC-721)

77- Setup NFT ERC 721 Contract on Remix - Exercise Part-1

78- NFT ERC 721 Deployment on SEPOLIA and Testing using Etherscan, MetaMask etc - Exercise Part-2

79- Attach IPFS URL with NFT ERC-721 Token - Exercise Part-3

80- Import NFT 721 ERC-Token to MetaMask - Exercise Part-4

81- Crypto Punk - Part 1

82- Final Thoughts on the NFT Role

83- References

84- Assignment 2: Write your ERC-721 token and upload that on the SEPOLIA Network (Share us its information)

85- CHAPTER #8 NFT Tokens and Advance Concepts - Lazy Minting VS Traditional Minting

86- Traditional Minting Process Flow

87- Lazy Minting Process Flow

88- EIP 712 and Ethers.js

88.1- Exercise 1- Initialize Hardhat and Openzeppelin imports in Contract

88.2- Exercise 2- Building NFT ERC721 Smart Contract

88.3- Exercise 3- Adding EIP 712 ECDSA Signature Standard for NFT Package verification

Comprehensive Assessment Approach

Our course employs a multifaceted assessment strategy to ensure a deep understanding and practical proficiency in DeFi, NFTs, and tokens:

- Quizzes and Practical Exercises: Regular quizzes and hands-on exercises reinforce theoretical knowledge and enhance practical skills in token and NFT development.
- Peer-Reviewed Assignments: Assignments related to key sections of the curriculum allow for the application of concepts in practical scenarios, with feedback from peers fostering a deeper learning experience.
- Capstone Projects: The course culminates in capstone projects where participants develop and deploy their tokens or NFTs on the Ethereum network, providing a comprehensive demonstration of their skills and knowledge.

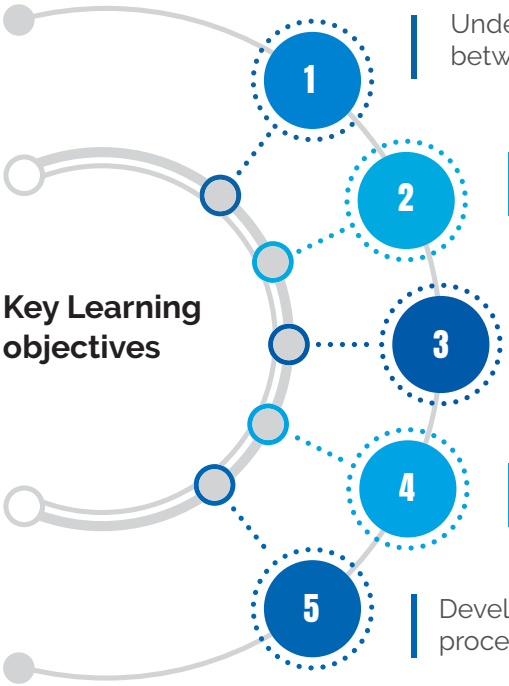
This comprehensive approach ensures that learners not only grasp theoretical concepts but are also proficient in applying them in real-world scenarios, preparing them for the dynamic and evolving DeFi ecosystem.

1.3.14 Private Blockchain in Hyperledger

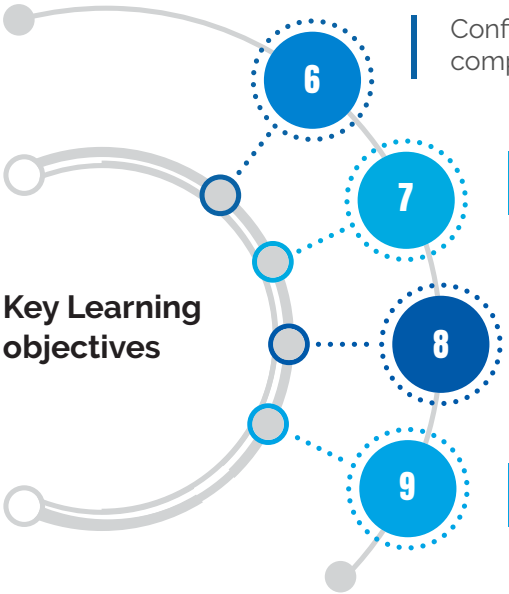
The course "Private Blockchain in Hyperledger Fabric" offers an extensive dive into the world of blockchain technology, with a special focus on private blockchains using Hyperledger Fabric. This learning journey is tailored for individuals eager to master the intricacies of developing, deploying, and managing blockchain applications with privacy, efficiency, and scalability in mind. Hyperledger Fabric stands out as a premier platform for private blockchain solutions, providing a modular architecture that supports a variety of industry-specific applications.

Key Learning Objectives

Upon completing this course, learners will have gained proficiency in the following critical areas:



1. Understand core blockchain concepts, terminologies, and the distinctions between private and public blockchains.
2. Gain deep insights into cryptography and public-key infrastructure, essential for securing blockchain transactions and data.
3. Master the consensus mechanisms that underpin blockchain operations, ensuring integrity and trust within the network.
4. Install and configure the Hyperledger Fabric environment, leveraging Docker and Docker Compose for a streamlined setup.
5. Develop and deploy chaincodes (smart contracts) for automating business processes on the blockchain.



6. Configure and manage peer nodes, channels, and the ordering service, critical components of the Hyperledger Fabric network.
7. Implement and enforce endorsement policies for transaction validation.
8. Utilise Hyperledger Fabric SDKs for building blockchain applications and interfaces.
9. Engage in comprehensive project work that simulates real-world blockchain application development, from conception to deployment and management.

Course Curriculum:

Introduction to Blockchain and Hyperledger Fabric: Understanding the Basics

The Building Blocks of Blockchain: Cryptography and Consensus Mechanisms

Setting Up the Development Environment: Docker, Docker-Compose, and Hyperledger Fabric Installation

Diving Deep into Hyperledger Fabric: Peers, Orderers, and Channels

Chaincode Development: Writing, Deploying, and Testing Smart Contracts

Managing the Network: Organizations, Endorsement Policies, and Channel Configuration

Advanced Topics: Working with the Hyperledger Fabric SDK and REST APIs

Real-World Applications: Designing and Implementing a Private Blockchain Solution

Capstone Project: Developing a Full-Fledged Blockchain Application with Hyperledger Fabric

Course Outline

1- Blockchain terminologies
2- Cryptography
3- Consensus
4- Introduction To Blockchian
5- Private VS Public Blockchain
6- Installtaion Guide
7- Public-Key Cryptography
8- Docker and Docker-Compose
9- Hyperledger Fabric
10- Ordering Service
11- Channel Configuration Properties
12- Peer
13- Fabric-CA
14- Chaincode
15- Endoserment Policies
16- Organizations
17- Binaries

18 - Config File
19- Hyperledger Component With Docker and Docker Compose File
20 - How To bring up network
21- Channel Creation and Joining
22- Chaincode
22.1- Install Chaincode
23- Hyperledger Fabric
24- Hyperledger Fabric RestAPI
25- Hyperledger Fabric Nodejs Server
26- Hyperledger With UI
27- Final Project
28- Supply Chain
29- Supplychain Project Chaincode
30- Supplychain Project RestAPI
31- Supplychain Project UI

Comprehensive Assessment Approach

Capstone Project: The course concludes with an ambitious capstone project, where learners will develop and present a comprehensive blockchain application using Hyperledger Fabric. This project will challenge students to apply all they have learned in a real-world context, demonstrating their ability to innovate and solve complex problems.

This assessment methodology ensures that participants not only grasp theoretical concepts but also excel in the practical application of Hyperledger Fabric, preparing them for the demands of the blockchain industry.