Bitcoin+ Executive™ (1 Day)
Program Detailed Curriculum

AI CERTs™

Bitcoin⁺ Executive™

Executive Summary

Bitcoin+ Executive™ certification program offers a comprehensive exposure into the world of blockchain and cryptocurrency. Delve into mechanics, smart contracts, and decentralized applications. Explore real-world applications, trading nuances, and regulatory landscapes. Grasp advanced concepts, future predictions, and synergies with other emerging technologies. Elevate your expertise in blockchain's evolving landscape with this holistic course.

Course Prerequisites

- Functional understanding of computing processes and open networks like internet
- Basic knowledge to follow pseudocode to understand a concept
- Ability to understand how various verticals work like finance, supply chains, asset trading etc.
- Fundamental understanding of how business utilizes information technology for process efficiencies and optimizations

Module 1

Introduction to Blockchain and Cryptocurrency

1.1 Risks and Benefits

- **Historical Vulnerabilities in Current Systems:** Explore the high-profile security breaches in centralized systems, systemic vulnerabilities, and single points of failure.
- **Need for Innovation:** Innovative solutions addresses traditional systems and stay competitive to ensure security, transparency, and efficiency.
- **Promise of Blockchain Technology:** Blockchain mitigates risks and resists tampering to enhance security and transparency in business process.
- **Efficiency and Streamlined Processes:** Explore the use of smart contracts and immutable records in business process to reduce inefficiencies and errors.

1.2 Databases – A Comparative Analysis

- **Traditional Database Architecture:** Outline the centralized nature of traditional databases for data management and access.
- **Decentralized Nature of Blockchain:** Understand the decentralized nature of blockchain for ensuring transparency and resilience.
- **Advantages and Disadvantages - Traditional Databases:** Explore the benefits and constraints associated with traditional databases.
- **Advantages and Disadvantages - Blockchain:** Explore Blockchain's potential benefits and drawbacks for implementing in business operations.

- **Relevance to Business Strategy:** Learn to align database choices with organizational goals, balancing efficiency, security, and innovation for sustained success.

1.3 Delving into Bitcoin

- **Origin and Historical Significance of Bitcoin:** Explore the concept of Bitcoin as decentralized digital currency and its significance as an innovation in finance.

- **Basics of Bitcoin Operations:** Outline the process of transactions and mining using bitcoin through blockchain along with the role of miners.

- **Types of Bitcoin Wallets and Security Features:** Explore various types of wallets and their security features to choose based on needs and prevent unauthorized access.

- **Understanding Bitcoin Exchanges:** Discuss the role of Bitcoin exchanges using cryptocurrencies in facilitating liquidity and price discovery and associated risks.

- **Fundamentals of Bitcoin Trading:** Discern the role of supply and demand in Bitcoin prices and its market dynamics for risk management.

1.4 Bitcoin Vs Blockchain

- **Distinguishing Between Blockchain and Bitcoin:** Understand the role of Blockchain as a technology and Bitcoin as an application to showcase their use.

- **Key Differences:** Discuss the primary purpose of Bitcoin and Blockchain and their use cases in business operations.

- **Key Similarities:** Decentralized principles of Blockchain and Bitcoin and use of cryptographic techniques to ensure data authenticity.

- **Business Implications:** Explore the potential of blockchain to drive innovation and its use cases for making investments or strategic partnerships.

Module 2

Understanding Bitcoin Blockchain Mechanics

2.1 Deep Dive into Components

- **Blocks: The Foundation of Blockchain:** Delve into the concept and role of blocks for transactions to create sequential chain of information.

- **Role of Hashing in Securing Data Within Blocks:** Discuss the purpose of hashing in securing data and tampering resistance within the blocks.

- **Significance of the Chain in Maintaining Ledger Integrity:** Explore Bitcoin Blockchain's role as a cryptographic chain to preserve transaction integrity and chronology.

- **Decentralization and Consensus:** Explain decentralization as a key feature of blockchain and rules of consensus mechanisms.

- **Immutability and Transparency:** Discern the role of immutability in blockchain and the nature of transparency associated with it.

2.2 Lifecycle of a Blockchain Transaction

- **Initiation of a Blockchain Transaction:** Explore various blockchain transactions and key transaction details for comprehensive understanding.

- **Validation by Network Nodes:** Understand the role of network nodes for transaction validation through consensus mechanisms and verify digital asset ownership.

- **Confirmation Through Consensus:** Explore the role of consensus mechanisms and block inclusion for confirmed transactions and immutable records.

- **The Role of Miners:** Explore miners as network participants solving complex problems, using Proof-of-Work to validate and add blocks.
- **Proof-of-Work (PoW) Concept:** Understand the role of energy-intensive proof-of-work in blockchain, weighing security benefits against sustainability concerns.

2.3 Understanding P2P Networks

- **Decentralized Peer-to-Peer Networks:** Explore the role of decentralized peer-to-peer networks, eliminating central authority.
- **Key Characteristics of Decentralized Networks:** Determine the characteristics that ensures transparency and resilience, minimizing single points of failure, fostering autonomy, and flexibility.
- **Benefits of Decentralized Networks Over Centralized Systems:** Discuss the benefits through distributed nodes, reduced reliance on intermediaries, and diverse participation.
- **Use Cases and Real-World Applications:** Explore Blockchain's impact on finance, supply chain, and healthcare and how files are shared and distributed.
- **Challenges and Considerations:** Showcase various challenges associated with decentralized networks to improve scalability, user performance, and compliance.

2.4 The Mystery of Consensus Protocols

- **Consensus in Blockchain: Ensuring Agreement:** Outline the role of consensus in the validity of transactions and the state of the ledger and fostering trust in decentralized systems.
- **Proof of Work (PoW): Solving Puzzles for Security:** Examine how PoW helps in solving puzzles to add blocks and ensure security through computation.
- **Proof of Stake (PoS): Participation Based on Ownership:** Showcase the role of PoS as a consensus mechanism in selecting validators based on staked cryptocurrency.
- **Comparing PoW and PoS: Energy Efficiency and Security:** Analyze blockchain energy efficiency, focusing on PoW's computational demands and PoS's reliance on economic incentives.
- **Scalability and Adaptability: Choosing the Right Protocol:** Evaluate blockchain scalability, analyzing consensus protocols' impact for PoW/PoS selection

Module 3

Bitcoin Script Decentralized Application

3.1 Bitcoin Scripting Basics

- Master the rules dictating Bitcoin transactions, from basic signatures to complex multi-party agreements, without intermediaries.

3.2. Script Types: P2PKH and P2SH

- **Bitcoin Addresses:** Gain proficiency in Bitcoin addresses like alphanumeric identifiers from public keys, crucial for secure sending and receiving of bitcoins transactions.
- **Public and Private Keys:** Explore how Bitcoin transactions rely on cryptographic keys; public keys generate addresses and verify signatures, while private keys ensure ownership.
- **Transaction Inputs and Output:** Learn Bitcoin transaction fundamentals: inputs reference previous UTXOs, specifying spent bitcoins; outputs define destinations and spending conditions.
- **Digital Signatures:** Understand how digital signatures in Bitcoin transactions prove ownership securely using private and public keys, fostering trust in transactions.

- **Hash Functions:** Explore hash functions' role in bitcoin blockchain, data integrity, and cryptography, covering algorithms and practical applications in this introductory course.

3.3 Script Operations

- Discover the foundational essence of Bitcoin script operations: guiding principles governing bitcoin usage in transactions. Ensure secure, customized transactions, verifying signatures, fulfilling conditions, and enhancing transaction details for seamless, safe exchanges.

3.4 Multisig Transactions

- Learn how Bitcoin's blockchain utilizes group consensus, akin to a joint bank account, where multiple parties must agree before any transaction is executed, ensuring heightened security and trust.

3.5 Escrow Services

- Learn how escrow bitcoin scripts function as trusted mediators in transactions. Set up smart contracts to secure bitcoins, ensuring payment release only upon mutual agreement. Safeguard online transactions with this course.

3.6 Time-Locked Contracts

- Discover Time-Locked Contracts in Bitcoin - akin to setting a timer on transactions. Ensure funds are only accessible after a set date or event. Enhance Bitcoin's functionality and flexibility.

3.7 Atomic Swaps

- Discover the mechanics of atomic swaps on the Bitcoin blockchain, enabling seamless peer-to-peer cryptocurrency exchanges. Learn about smart contract implementation, cryptographic security, and trustless transaction execution for fair and secure trades.

3.8 Payment Channels

- Understand the potential of Bitcoin script to establish payment channels on the blockchain, enabling seamless, private transactions without frequent ledger entries. Optimize transaction efficiency, privacy, and cost-effectiveness with this cutting-edge digital payment solution.

Module 4

Blockchain Frameworks

4.1 Ethereum and Its Ecosystem

- **Introduction to Ethereum and Smart Contracts:** Outline the role of Ethereum as a decentralized platform and role in enabling (DApps) and programmable agreements.
- **Smart Contracts on Ethereum:** Understand the function of smart contract on the Ethereum blockchain and its nature for streamlining processes.
- **Ethereum Request for Comments (ERC) Standards:** Discover the Role of ERC standards for creating and implementing tokens and smart contracts on the Ethereum blockchain.
- **Key ERC Standards:** Outline various ERC standards and their role in creating different types of tokens.
- **Real-World Applications and Business Impact:** Explore the real-world examples of how smart contracts and ERC standards are being utilized across different industries.

4.2 Introduction to Other Frameworks

- **Hyperledger:** Explore the role of Hyperledger as an open-source blockchain framework for building industry-specific solutions.
- **Multichain:** Describe Multichain as a platform for creating private blockchain networks with restricted access and its role in various industries.
- **EOS:** Showcase EOS is a blockchain platform known for its emphasis on scalability and user-friendliness and and its role in various industries.
- **R3 Corda:** Explore the R3 Corda as a blockchain platform emphasizing on privacy and interoperability and its comprehensive role in finance sector
- **Introducing Other Emerging Blockchain Players:** Outline various emerging blockchain frameworks for potential industry disruption and advancements in blockchain technology.

Module 5

Advanced Blockchain Concepts

5.1 Layer 2 Scaling Solutions

- Explore Layer 2 solutions for Bitcoin blockchain, enhancing scalability and efficiency by processing transactions off-chain. Learn about Lightning Network's payment channels enabling instant, low-cost transactions, tackling network limitations.

5.2 Privacy Enhancements

- Discover privacy enhancement solutions on the Bitcoin network, like CoinJoin, designed to boost transaction confidentiality and anonymity. Learn how CoinJoin obscures links between input and output addresses for enhanced privacy.

5.3 Smart Contracts on Bitcoin

- Delve into Bitcoin's smart contracts—automated agreements activated by set conditions. Leveraging Bitcoin's scripting language, these contracts enforce conditions like time locks and multi-signature requirements, ensuring secure and efficient transactions.

5.4 Sidechains and Drivechains

- Explore Bitcoin sidechains and drivechains, innovative solutions augmenting Bitcoin's functionality and utility. Sidechains, separate blockchains interoperable with Bitcoin, facilitate asset and data transfer, while drivechains ensure security and decentralization by anchoring directly to Bitcoin.

5.5 Atomic Swaps

- Dive into Bitcoin atomic swaps, pioneering trustless cryptocurrency exchanges via smart contracts. Exchange secrets to unlock funds securely, fostering decentralized transactions and revolutionizing cryptocurrency trading.

5.6 Schnorr Signatures and Taproot

- Discover Bitcoin's Schnorr Signatures and Taproot upgrades, designed to enhance privacy, scalability, and functionality. Schnorr Signatures enable compact, aggregated signatures, reducing transaction sizes and blockchain data, with provable security benefits

5.7 Decentralized Autonomous Organizations (DAOs)

- Delve into Bitcoin Decentralized Autonomous Organizations (DAOs), autonomous entities on the Bitcoin network governed by smart contracts. Explore their transparent and decentralized governance and investment mechanisms, alongside challenges and future potential.

5.8 Tokenization and Asset Issuance

- Explore Bitcoin tokenization and asset issuance, transforming real-world or digital assets into tokens on the Bitcoin blockchain. Learn protocols like Omni Layer and Counterparty for creating and managing these tokens.

5.9 Cross-Chain Interoperability

- Discover how Bitcoin Cross-Chain Interoperability facilitates seamless communication between blockchains, akin to highways linking smoothly. Assets and data transfer securely without intermediaries, enhancing flexibility and efficiency in digital asset utilization.

5.10 Governance and Protocol Evolution

- Understand how the decentralized Bitcoin network evolves over time through consensus-driven decision-making, proposing changes, and implementing updates for security, scalability, and functionality improvements.

Module 6

Cryptocurrencies: Trading, Regulations, and Compliance

6.1 The Financial Side of Cryptos

- **Cryptocurrency Wallets and Security Features:** Explore the various types of cryptocurrency wallets and their use in reducing the risk of online hacking. Highlight the significance of encryption, strong passwords, and keeping wallet software up to date for protection against potential vulnerabilities.
- **Cryptocurrency Exchanges and Fundamentals of Trading:** Learn the fundamentals of centralized and decentralized exchanges and the process to create and verify accounts. Understand the concept of trading pairs, market and limit orders. Explore risk management through research and best security practices.

6.2 Dive into ICOs, DAOs, NFTs, and DeFi

- **Exploring the Role of Innovations in the Crypto World:** Explore the role of Initial Coin Offerings (ICOs), Decentralized Autonomous Organizations (DAOs), Non-Fungible Tokens (NFTs), and Decentralized Finance (DeFi) for fundraising, self-governance, unique assets, and decentralized finance, while addressing associated benefits and challenges.
- **Assessing Benefits, Challenges, and Future Predictions:** Understand how blockchain and smart contract technologies drive innovation and efficiency, navigate regulatory uncertainties, address security concerns, and predict integration into mainstream industries, regulatory evolution, user-friendly solutions, and continued innovation.

6.3 Legal and Compliance

- **Examining the Regulatory Landscape:** Discover how regulations for cryptocurrencies differ worldwide, affecting their acceptance and industry growth. Explore various regulatory methods and the difficulty of balancing innovation with managing risks like fraud and money laundering.
- **Discussing Challenges Faced by the Crypto Industry:** Outline challenges in the crypto industry, focusing on regulatory uncertainty and compliance complexities. Address KYC/AML requirements, banking access issues, and the integration hurdles with traditional finance, emphasizing the need for clear guidelines and collaboration for industry growth.

- **Potential Regulatory Responses:** Explore the vital role of regulatory clarity in the crypto industry and its impact for balanced regulations, advocate international cooperation, and suggest tailored approaches and innovation-friendly regulations.

Bitcoin Real-world Applications

7.1 Lightning Network (Layer 2 Solution)

- Explore Lightning Network, a Layer 2 solution for Bitcoin scalability. Learn its off-chain protocol, instant transactions, micropayments, and how it enhances Bitcoin's efficiency, scalability, and privacy.

7.2 RSK (Rootstock)

- Delve into the mechanics of Rootstock (RSK), examining its integration with Bitcoin, smart contract functionalities, security protocols, and real-world applications in decentralized finance and beyond.

7.3 Liquid Network (Sidechain Solution)

- Explore the Liquid Network's sidechain solution, delving into its role in facilitating faster, confidential transactions for Bitcoin, its design principles, security features, and practical applications.

7.4 Atomic Swaps

- Learn the principles and applications of cross-chain atomic swaps, enabling secure, trustless exchanges between different cryptocurrencies without intermediaries. Dive into blockchain interoperability.

7.5 Lnbits

- "Learn the basics of LNbits, a powerful tool for Lightning Network applications. Explore its features for managing Lightning wallets, payments, and custom plugins efficiently.

7.6 Bottle Pay

- Understand how Bottle Pay transform Social Media Tipping with Bitcoin. Instantly send low-cost Bitcoin tips to creators on Twitter, Reddit, and Telegram via the Lightning Network. Empower engagement effortlessly.

7.7 Zap Wallet

- Learn the principles and applications of cross-chain atomic swaps, enabling secure, trustless exchanges between different cryptocurrencies without intermediaries. Dive into blockchain interoperability.

7.8 Muun Wallet

- Learn how to seamlessly manage Bitcoin with full control. Supports both on-chain & Lightning Network transactions. Non-custodial, secure storage on users' devices. Empowering users with flexibility and sovereignty over their funds.

7.9 Sphinx Chat

- Discover a groundbreaking messaging app atop Lightning Network. Send encrypted messages, conduct Bitcoin payments seamlessly. Embrace privacy, censorship resistance, fast transactions. Experience messaging fused with payment functionalities.

7.10 Tippin.me

- Learn to revolutionize tipping with Tippin.me and seamlessly integrate it with social media, send micropayments to content creators. Easy setup, track tips, prioritize privacy/security. Empower content creators with microtransactions.

7.11 SparkSwap

- Explore decentralized exchange (DEX) enabling direct crypto trades from Bitcoin wallets via Lightning Network. Trustless, non-custodial, leveraging Lightning for instant, low-cost transactions. Simplified peer-to-peer trading experience.

7.12 RGB (Colored Coins Protocol)

- Discover how RGB transform the Bitcoin blockchain, RGB empowers users to issue and exchange custom tokens representing real-world assets securely and seamlessly, enhancing Bitcoin's functionality and accessibility.

7.13 Bisq

- Learn how to use Bisq, a decentralized exchange for cryptocurrency trading. Trade directly with peers, bypassing intermediaries, and enjoy a secure, censorship-resistant platform leveraging Bitcoin's blockchain.

Module 8

Blockchain and Other Technologies

8.1 Bitcoin Blockchain Integrations with Emerging Tech

- Explore the fusion of Bitcoin's blockchain with cutting-edge technologies. Discover applications and integrations with AI, IoT, and more in this dynamic course on emerging tech integration.

8.2 Internet of Things (IoT) Integration

- Explore the seamless integration of devices, sensors, and networks in the Internet of Things (IoT), covering protocols, platforms, and strategies for effective connectivity and data exchange.

8.3 Artificial Intelligence (AI) Integration

- Explore the seamless integration of Artificial Intelligence (AI) into various domains. Learn AI fundamentals, techniques, and applications to enhance decision-making and problem-solving across industries.

8.4 Edge Computing Integration

- Learn to seamlessly integrate edge computing solutions into existing infrastructure. Explore deployment strategies, data synchronization, security measures, and optimization techniques for efficient edge-to-cloud connectivity. Practical insights for real-world implementation.

8.5 Quantum Computing Integration

- Explore the seamless integration of quantum computing into existing systems, covering fundamental principles, practical applications, and potential challenges in harnessing the power of quantum technologies.

8.6 Biometrics and Authentication Integration

- Discover the seamless fusion of biometric technologies with authentication systems. Learn to deploy robust security solutions for modern access control challenges.

8.7 Supply Chain and Logistics Integration

- Explore how blockchain technology revolutionizes supply chain and logistics integration, covering concepts like transparency, traceability, and efficiency through decentralized ledger systems. Practical applications and case studies included.

8.8 Decentralized Identity and Authentication Integration

- Explore decentralized identity and authentication integration within blockchain technology. Learn concepts of self-sovereign identity, cryptographic protocols, and their implementation for secure, trustless authentication in decentralized systems.