



# **Certificate Program**

## **Block Chain Management**

**Subject Name: Programming in Python**

**Total Units: 14**

### **Unit 1**

- Unit 1: Python Basics Keywords and Identifiers
- Unit 2: Python Variables and Definitions
- Unit 3: Python Data Types
- Unit 4: Python Operators

### **Unit 2**

- Unit 5: Python Control Statements
- Unit 6: Looping Statements - I
- Unit 7: Looping Statements - II

### **UNIT 3**

- Unit 8: Python Lists
- Unit 9: Python Tuples
- Unit 10: Python Sets
- Unit 11: Python Dictionary

### **UNIT 4**

- Unit 12: Python Functions
- Unit 13: Arrays in Python
- Unit 14: Exception Handling in Python

**Subject Name: Foundations of Blockchain**



## **Total Units: 14**

### **UNIT 1**

- Unit 1: Introduction to Blockchain
- Unit 2: Platforms of Blockchain

### **UNIT 2**

- Unit 3: Tools and Interfaces of Blockchain
- Unit 4: Blockchain applications - FinTech, IoT
- Unit 5: Blockchain Applications - Industrial & Manufacturing, Registry of Assets & Inventory, Energy
- Unit 6: Blockchain Applications - Supply Chain & Logistics
- Unit 7: Blockchain Applications - Records & Identities, Healthcare.

### **UNIT 3**

- Unit 8: Benefits and challenges of Blockchain
- Unit 9: Blockchain Application Templates - Components and Design methodology
- Unit 10: Blockchain Application Templates

### **UNIT 4**

- Unit 11: Ethereum Development Tools
- Unit 12: Ethereum Clients
- Unit 13: Ethereum Languages
- Unit 14: Ethereum Accounts

## **Subject Name: Cryptocurrency and Cyber security**

## **Total Units: 14**

### **UNIT 1**

- Unit 1: Mining, Consensus on Block chain network
- Unit 2: Mining Stages



## **UNIT 2**

- Unit 3: State storage in Ethereum
- Unit 4: World state, Transaction List, Transaction Receipts
- Unit 5: Modified Merkle Patricia tree
- Unit 6: Whisper Protocol, Whisper Envelope and Message
- Unit 7: Configurable Privacy and efficiency

## **UNIT 3**

- Unit 8: Whisper Communication Patterns & Whisper wire protocol
- Unit 9: Posting a message and Topics, Abridged topics and Bloomed topics
- Unit 10: Whisper Routing Approaches & Whisper API

## **UNIT 4**

- Unit 11: Cryptography, Classical Ciphers, One Time Pad
- Unit 12: Stream Cipher Information Theoretic Security
- Unit 13: Pseudo random number generator, Block cipher Data encryption standard
- Unit 14: Cryptographic hash function, cryptographic message authentication code

## **Subject Name: Blockchain Technologies**

### **Total Units: 14**

### **Unit-1**

- Unit 1: Smart Contracts, Structure of a Contract, Setting up and Interacting with a Contract using Geth Client
- Unit 2: Compiling & Deploying a Contract, Transactions and Calls, Interacting with a Contract
- Unit 3: Gas, Logs and Events, Smart Contract Examples

## **UNIT 2**



- Unit 4: Introduction to Smart Contract Patterns, Name Registry Contract, Conditions-Effects-Interaction, Smart Contract Patterns
- Unit 5: Use Cases and Applications of Name Registry Contracts, Design and Implementation Considerations, Real-world Examples and Case Studies
- Unit 6; Exploring the Conditions-Effects-Interaction Pattern, How Conditions, Effects, and Interaction Components Work Together, Advantages of applying the Conditions-Effects-Interaction (CEI) pattern
- Unit 7: Smart-Contract Patterns, Smart Contract Design, Solidity Common Pattern

### **Unit-3**

- Unit 8: Implementing Dapps, Case Studies
- Unit 9: Crowdfunding, Event Registration, Document Verification, Interest Rate Swap
- Unit 10: Industrial IoT: Machine Maintenance and Solar Charging Stations, Case Study on Smart Switch Dapp
- Unit 11: Solar Charging Stations, Case Study on Smart Switch DApp

### **Unit-4**

- Unit 12: Swarm Architecture and Concepts, Swarm Nodes
- Unit 13: Storage Layer, Network Layer, Incentive Mechanisms: SWAP, SWEAR, SWINDLE
- Unit 14: Swarm Setup, Working with Swarm