

Module 1: Cryptocurrency & Blockchain

Goal: In this module, you will learn the concept of cryptocurrencies and networking structure.

Objective: At the end of this module, you should be able to:

- Understand the drawbacks in current financial system
- Infer how spectrum of finance can be secured using distributed system
- Induce the key concepts which constitutes the Distributed System
- Infer various types of cryptocurrencies
- Deduce various uses of cryptocurrencies

Topics:

- Transformation in trading units
- Cryptography and Crypto-currency
- Anonymity and Pseudonymity in cryptocurrencies
- Digital Signatures
- Cryptocurrency Hash codes
- Distributed networks Skills:
- Cryptography concepts
- Cryptocurrencies
- Distributed Ledger – Concepts

Module 2: **Delving into Blockchain**

Goal:

In this module, you will learn blockchain technology and its architecture

Objective: At the end of this module, you should be able to:

- Explain blockchain and its uses
- Grasp the components of a blockchain ecosystem
- Induce the structure and mechanisms of a blockchain
- Deduce various cryptography and consensus algorithm
- Fathom different types of blockchain
- Infer various types of blockchain platforms

Topics:

- Introduction to Blockchain
- Why Blockchain is crucial?
- Key vocabulary while discussing Blockchain

- Distinction between databases and blockchain
- Explaining Distributed Ledger
- Blockchain ecosystem
- Blockchain structure
- Working of blockchain technology
- Permissioned and permission-less blockchain

Skills:

- Cryptography concepts
- Cryptocurrencies (Bitcoin)
- Distributed Ledger – Concepts
- Consensus Methods

Hands On:

- Show how a blockchain works

Module 3: **Bitcoin and Blockchain**

Goal:

In this module, you will learn about bitcoins. You will understand why transactions with bitcoins is secure and efficient. Also, you will learn how bitcoin network works.

Objective:

At the end of this module, you should be able to:

- Infer bitcoin and its uses
- Deduce, how to store, buy and sell bitcoins
- Setup your own bitcoin wallet
- Explain the working of bitcoin transaction system.
- Perceive the scripting language of bitcoin
- Deduce nodes and network of bitcoin
- Comprehend various roles a person can play in Bitcoin ecosystem

Topics:

- Bitcoin and its History
- Why use bitcoins?
- Where and how to buy bitcoins
- How to store bitcoins?
- How and where to spend bitcoins?
- Selling bitcoins
- Bitcoin transactions
- How bitcoin transactions work
- What happens in case of invalid transactions
- Parameters that invalidate the transactions
- Scripting language in bitcoin
- Applications of bitcoin script

- Nodes and network of bitcoin
- Various roles you can play in bitcoin ecosystem

Skills:

- Cryptocurrencies (Bitcoin)

Hands On:

- Setting up bitcoin wallet
- Creating a paper wallet
- Transaction tracking of bitcoin

Module 4:

Bitcoin Mining

Goal:

In this module, you will learn more about bitcoins and its mechanisms. You will understand why transactions with bitcoins is secure and efficient. Also, you will learn how bitcoin mining works. You will also be taught, how to mine bitcoin from your own personal computer

Objective:

At the end of this module, you should be able to:

- Deduce the purpose of mining
- Comprehend bitcoin mining
- Perceive the importance of mining pools
- Infer bitcoin security

Topics:

- Purpose of Mining
- Algorithm used in mining
- Mining hardware
- How bitcoin mining works?
- Bitcoin mining pools
- How cloud mining of bitcoin works?
- Mining Incentives
- Security and Centralizations

Skills:

- Cryptocurrencies (Bitcoin)
- Mining Bitcoins Hands On:
- Installing bitcoin mining software
- Mining bitcoin on your PC

Module 5: Ethereum

Goal:

In this module, you will learn Ethereum (Another Blockchain platform). You will also learn Solidity: An Ethereum programming language

Objective:

At the end of this module, you should be able to:

- Perceive the Ethereum Ecosystem
- Understand how mining works in Ethereum
- Learn Solidity programming language

Topics:

- What is Ethereum?
- What is Ether?
- How to use Ethereum?
- The Ethereum ecosystem, DApps and DAOs
- How Ethereum mining works
- Learning Solidity * Contract classes, Functions and conditionals * Inheritance & abstract contracts o Libraries * Types & Optimization * Global Variables o Debugging * Future of Ethereum

Skills:

- Cryptocurrencies (Ethereum)
- Developing Smart Contracts

Module 6:

Setting up Private Blockchain Environment using Ethereum Platform

Goal:

In this module, you will learn about public and private blockchain. You will be able to setup your private blockchain environment. Also, you will be developing a smart contract on Ethereum and will be deploying it on web and console

Objective:

- At the end of this module, you should be able to
- Explain the steps required to build a blockchain solution
 - Setup your private blockchain environment
 - Analyze the blockchain environment.
 - Develop smart contract on Ethereum
 - Deploy the contract on Web and console

Topics:

- Private and public blockchain
- Various blockchain setup platforms
- Using Ethereum to setup private blockchain
- Steps to build a blockchain solution
- Smart contract on Ethereum
- Compile, deploy and instantiate contracts
- Configuring, running and working with the go-Ethereum client
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Account management and mining

Skills:

- Apprehend another blockchain platform: Ethereum
- Understand the different stages of a contract deployment
- How to interact with a contract once deployed?

Skills:

- Implementing Blockchain using Ethereum
- Developing Smart Contracts

Hands On:

- Installing Ethereum software
- Setting up servers
- Creating blockchain environment
- Mining of Ether
- Sending of Ether
- Tracking information using hash
- Viewing Information about blocks in blockchain
- Developing smart contract on private blockchain
- Deploying contract from web and console

Module 7:

Hyperledger Goal: In this module, you will learn about Hyperledger project to develop an enterprise-grade and open-source distributed ledger framework. You will be taught the Hyperledger architecture and the consensus mechanism applied in the Hyperledger. Also, you will learn four major Hyperledger frameworks.

Objective:

At the end of this module, you should be able to: • Apprehend Hyperledger project • Infer the Hyperledger architecture • Explore the consensus mechanism in Hyperledger • Landscape Four major Hyperledger frameworks

Topics:

- Introduction to Hyperledger
- Hyperledger architecture
- Membership
- Blockchain
- Chaincode
- Consensus
- Consensus & its interaction with architectural layers
- Application programming interface
- Application model
- Network topology
- Exploring Hyperledger frameworks
- Hyperledger Fabric
- Hyperledger Indy
- Hyperledger Iroha
- Hyperledger Sawtooth

- Blockchain Platforms (HyperLedger) Hands on:
- Creating and Deploying a Business Network on Hyperledger Composer Playground
- Testing the business network definition
- Transferring the commodity between the participants

Module 8:

Setting up development environment using Hyperledger Composer

Goal:

In this module you will learn about Hyperledger Fabric. You will be taught to develop business networks using Hyperledger Composer. Also, you will be deploying & testing your business network.

Objective:

At the end of this module, you should be able to:

- Develop & deploy business networks
- Interact with Hyperledger Fabric Blockchain using Hyperledger Composer
- Infer Hyperledger Fabric

Topics:

- Setting up development environment using Composer
- Developing business networks
- Testing business networks
- Introduction to Hyperledger Fabric
- Hyperledger Fabric Model
- Various ways to create Hyperledger Fabric Blockchain network

Skills:

- Implementing Blockchain using HyperLedger Fabric

Hands On:

- Setting up Hyperledger Fabric blockchain using Hyperledger Composer locally
- Developing business network
- Deploying & testing business networks

Module 9:

Create & deploy your private Blockchain on MultiChain
Goal: In this module, you will learn about MultiChain platform. You will be able to setup your private blockchain environment. Also, you will be able to customize your blockchain parameters as per your requirements.

Objective:

At the end of this module, you should be able to:

- Infer Multichain platform for blockchain applications
- Comprehend mining in MultiChain
- Setup your own private blockchain using MultiChain

Topics:

- Introducing MultiChain
- Privacy & Permissions in MultiChain
- Mining in MultiChain
- Multiple configurable blockchains using MultiChain
- Setting up a private blockchain
- Creating a blockchain
- Connecting to a blockchain
- Some commands in interactive mode
- Using native assets
- Transaction metadata
- Streams
- Round robin mining

Skills:

- Blockchain Platforms (MultiChain)
- Implementing Blockchain using MultiChain

Hands on:

- Creating private blockchain
- Connecting to your blockchain
- Create a new asset and sending it between nodes
- Mining between nodes

Module 10:

Prospects of Blockchain

Goal:

In this module, you will understand how blockchain is essentially shaping the future economics. Discussions on various use-cases of blockchain will clear the missing segment of the picture.

Objective:

At the end of this module, you should be able to

- Understand various practical uses of blockchain
- Infer the Impact of blockchain on our world
- Explain blockchain using real case scenarios
- Infer a blockchain application platform

Topics:

- Blockchain prospering our world
- Blockchain transforming business and professionalism
- Discussing practical use-cases of blockchain
- How can we take Aadhaar Card on blockchain?
- How blockchain can be used to remove corruption
- Real case scenarios of Blockchain
- Blockchain in Banking System
- Blockchain in Land Registry
- Blockchain in Capital Market
- Use cases for government
- Summary of the course

Skills:

- Blockchain frameworks and business applications

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