

# BLOCKCHAIN



## COURSE CURRICULUM

### ABOUT THE COURSE

The course is designed to introduce you to the concept of Blockchain and explain the fundamentals of blockchain and bitcoin. The course will provide an overview of the structure and mechanism of blockchain. As a beginner, you will be learning the importance of consensus in transactions, how transactions are stored on blockchain, history of bitcoin and how to use bitcoin. Furthermore, you will be taught about the Ethereum platform and its programming language. You will setup your own private blockchain environment using Ethereum. Also, you will develop a smart contract on private Ethereum blockchain and will be deploying the contract from web and console. The course is fed with various use-cases and examples, which makes the learning more interesting.

### MODULE 1

Introduction to Cryptocurrency and Networking Concepts.

#### GOAL

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

#### OBJECTIVES

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

- Explain cryptography and cryptocurrency
- Infer hash functions
- Distinguish the various network structures
- Explain why decentralized systems are efficient

#### TOPICS

- Transformation in trading units
- Cryptography and Crypto-currency
- Anonymity and Pseudonymity in cryptocurrencies
- Digital Signatures
- Cryptocurrency Hash codes
- Peer to peer networks (structured and unstructured)

#### HANDS ON:

- Demonstrating hash codes
- Create your own cryptocurrency

### MODULE 2

Overview of Blockchain

#### GOAL

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

#### OBJECTIVES

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

- Explain blockchain and its uses
- Understand the structure and mechanisms of a blockchain.

## 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

## Hands On:

- Demonstrating valid and invalid transaction
- Demonstrating Blockchain

## 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.

## OBJECTIVES

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

- Explain bitcoin and its uses
- 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

## 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.

## OBJECTIVES

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

- Comprehend bitcoin mining
- 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 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.

## OBJECTIVES

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

- Apprehend another blockchain platform: Ethereum
- Learn Solidity: all aspects from value types and inheritance to more exotic features and optimization

### 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
  - Libraries
  - Types & Optimization
  - Global Variables
  - Debugging
- Future of Ethereum

## 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.

## OBJECTIVES

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

- Explain the steps required to build a block-chain solution
- Setup your private blockchain environment
- Analyse 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
- Account management and mining
- Understand the different stages of a contract deployment
- How to interact with a contract once deployed?

## 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

Prospects of the blockchain

## GOAL

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

## OBJECTIVES

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 Govt.
- Summary of the course

## PROJECT:

Building A private banking system using blockchain with various nodes and accounts

Partners :



Java



development | consultancy | training

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