

The background of the entire page is a solid orange color. Overlaid on this background is a faint, light-colored network diagram. This diagram consists of numerous circular nodes, some of which contain icons such as a person, a document, a Wi-Fi signal, and a group of people. These nodes are interconnected by thin, light-colored lines, creating a complex web-like structure that represents a blockchain network.

# **SYLLABUS**

# **BLOCKCHAIN**

# **DEVELOPMENT**

# **PATH**

# Overview

In this course, you will learn all you need to harness the power of one of the most disruptive technologies i.e. Blockchain.

Who is this course meant for:

1. Anyone who wants to start a career in Blockchain
2. Any Blockchain and cryptocurrency enthusiast
3. Anyone interested in building decentralized applications
4. Anyone interested in the applications of blockchain technology
5. Anyone who wants to understand the basic to advanced concepts related to blockchain

**LESSON  
ONE****INTRODUCTION TO BLOCKCHAIN AND  
ETHEREUM**

- What is a Blockchain and why should I care?
- Blockchain Architectural Overview
- The Web of Trust
- Ethereum's main components
- Ethereum's sub-protocols
- The new generation of the Web (i.e., Web3.0)
- Smart Contracts and Decentralized Applications (dApps)
- Web apps vs. dApps

**LESSON  
TWO****INTRODUCTION TO SMART CONTRACTS**

- An overview to the history of smart contracts
- An intro to the life-cycle of a smart contract
- Ethereum's smart contract languages
- Interfacing with Ethereum Networks (overview of
- Ethereum Networks, Clients, Wallets, Transactions etc.)
- The Solidity Programming Language
- Development Environments

**LESSON  
THREE****BLOCKCHAIN TECHNOLOGY SUPPORTING  
TURING-COMPLETE LANGUAGES**

- A comparison of Ethereum and Bitcoin
- Overview of Ethereum's tech stack, architecture
- The Ethereum reward scheme, Mist, EVM, Swarm, Whisper, Eth, Gas

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#### LESSON FOUR

### VIRTUAL MACHINES AND BEYOND

- History of Virtual Machines
- State replication, consensus and the Ethereum Architecture
- Introduction to the Ethereum Virtual Machine and EVM Byte Code interpretation
- Incentivisation structures, rewards schemes, and gas pricing

#### LESSON FIVE

### INTRODUCTION TO THE DAPP DEVELOPMENT PIPELINE

- Introduction to development with Solidity
- Development environments (Truffle)
- Intro to Solidity
- Smart contract layout
- The structure of .sol source file

#### LESSON SIX

### DEEP-DIVE INTO SOLIDITY

- Understanding the different compiler versions and pragmas
- Authoring smart contracts
- Contract definitions

- Basic data types
- Local and State Variables

**LESSON  
SEVEN****GLOBAL VARIABLES AND FUNCTIONS**

- Predefined Global Variables
- Structs and Enums
- Mapping and Arrays
- Build-in Functions (e.g., addmod, keccak256)
- User Functions

**LESSON  
EIGHT****EXPRESSIONS AND CONTROL  
STRUCTURES**

- Valid expressions of the language
- Exception Handling (e.g., assert, require, revert, throw)
- Events and Logging
- Conditional logic
- Implementation of loops

**LESSON  
NINE****OBJECT ORIENTED CONSTRUCTS**

- Contract constructor and selfdestruct
- Function Modifiers and Fallback functions
- Calling other contracts
- Inheritance and Multiple Inheritance
- Declaring Abstract Classes and Interfaces
- Implementation of Abstract interfaces
- Function Overloading

LESSON  
TENUNIT TESTING AND DEBUGGING  
CONTRACTS

- Estimating Gas Costs
- Basics of using Truffle for testing
- Troubleshooting and Debugging
- Common design patterns
- Smart Contract Security – overview of attacks on
- Ethereum smart contracts

LESSON  
ELEVEN

## BUILDING THE FRONT-END APPLICATION

- Intro to front-end web technology (React.js)
- A deeper dive into web3.js
- Understanding call and send methods in web3.js
- Signing transaction with Metamask
- Listening to events on providers

LESSON  
TWELVE

## PROJECTS

- A simple cryptocurrency vault
- A standard ERC20 token
- NFT marketplace
- Staking and farming protocol
- Understanding auto-liquidity generation protocol