GEMRAIN CONSULTING

Developing On Ethereum

BC-107

Duration: 3 days; Instructor-led
Time: 9:00 AM – 5:00 PM

ABOUT THIS COURSE

This 3-day instructor-led course is developed with a focus on the core concepts of the Ethereum Blockchain. It is designed for programmers and developers who want to take a comprehensive deep dive in writing smart contracts and building applications that interact with them. This course provides detailed overviews of Ethereum, smart contracts, and the development language, Solidity.

OBJECTIVES

In this course, participants will learn about:

- Complete understanding of Ethereum Blockchain
- Plan and prepare production ready applications for the Ethereum blockchain
- In-depth knowledge of Smart Contracts and Decentralized applications
- Write, test, and deploy secure Solidity smart contracts
- Understand and work with Ethereum fees
- Use the essential tooling and systems needed to work with the Ethereum ecosystem
- Exploration of known Ethereum Blockchain's use-cases
- Ability to differentiate between Blockchain according to the requirements
- Ability to transfer or mitigate Blockchain for businesses and enterprises

Participants who attend this course will be able to demonstrate their ability to:

- Implement web3.js
- Write and compile Solidity smart contracts
- Create secure smart contracts
- Deploy smart contracts both the live and test Ethereum networks
- Calculate Ethereum gas costs
- Unit test smart contracts
- Run an Ethereum node on development machines

PREREQUISITES

- Necessary: Basic knowledge in JavaScript / HTML
- Good to Have: Basic knowledge in C ++ / Java, data types
- Good to Have: Basic knowledge with git repositories

AUDIENCE

Due to the technical programming lab content covered in this course, it is not recommended for those without programming knowledge and experience.

Target audience includes:

- IT Professionals with programming experience
- Network Architects
- Network Security Architects
- Application Developers
- System Architects

COURSE CONTENTS

Module 1: What is Blockchain?

- The History of Decentralized Ledgers
- Blockchain Mechanics
- Assets in Blockchain
- The Blockchain Ledger
- Type of Blockchain Transactions
- Blockchain as Workflow

Module 2: The History of Blockchain

- Bringing DLT into the Modern Age
- What is a Block?
- How are Blocks Chained?
- Bitcoin
- Ethereum
- Hyperledger

Module 3: How Does Blockchain Work?

- Benefits and Drawbacks of Blockchain
- Cryptography: 2-way functions
- Cryptography: Hashes
- Databases vs. Blockchain

Module 4: Blockchain Use Cases and Real-World Implementations

- Blockchain Use Case Symptoms
- Blockchain Use Case Analysis and Scorecarding
- Good Blockchain Use Case Patterns
- Real World Implementations
- The Web 3.0 Revolution

Module 5: Group Consensus Models

- Proof of Work Deep Dive
- The is The Nonce?
- Hacking the Ledger
- Costs of a 51% Attack
- Group Consensus Models and Game Theory

Module 6: Proof of Stake and the Future of Ethereum

- How Does PoS Work?
- PoS vs PoW
- Ethereum 2.0
- Sharding
- How does PoW fit in?
- Group Consensus vs Participant Consensus

Module 7: Ethereum Application Architecture

- Decentralized Application Layers
- Technologies and Components of Each Layer
- Development Tools, Frameworks, and Utilities

Module 8: Sample Application Walkthrough

- Sample Application Use Case Walkthrough
- End User Solution Review
- Solution Code Review: User Interface
- Solution Code Review: Integration Layer
- Solution Code Review: Smart Contract

Module 9: DevOps Considerations

- Ethereum Smart Contract Lifecycle
- The Self-Destruct Function
- Agile in the World of Blockchain?
- The Project Team
- Blockchain Projects vs Traditional Projects

Module 10: Security Considerations

- Protecting Self-Destruct
- Code Visibility
- DevOps Vulnerabilities
- Common Blockchain Exploits

Module 11: Ethereum 2.0

- Ethereum 2.0 - What's Different
- Ethereum Shards

Module 12: Lab Environment Setup and Configuration

- Downloading and Installing VirtualBox
- Setting Up Your Environment
- Configuring Your Environment