Introduction to Blockchain Courses

Introduction to Blockchain and Ethereum	GuruTeam course code: GTBCE
Introduction to Blockchain and Corda	GuruTeam course code: GTBCC

Course Description

In this course, we introduce the fundamentals of blockchain and cryptocurrency technologies. We will discuss when to apply these approaches to existing or greenfield architectures.

Attendees will be able to see the power of the approach by building and working with a simple blockchain from scratch. With this context, we will move on to discuss the Bitcoin network and currency in detail and the design choices that it makes.

Ethereum Course

The second half of the course introduces the Ethereum network and its notions of smart contracts, gas and related tech, including the Ethereum Virtual Machine (EVM). We discuss distributed apps and look at some recent high-profile case studies.

The Solidity programming language is introduced from scratch as well as a typical development environment for new smart contracts. Finally, we show to integrate Ethereum smart contracts with existing applications by using the Web3j library to bridge Java applications with the Ethereum network and blockchain.

Corda Course

Our Blockchain with Corda course introduces the Corda distributed ledger and distributed apps. These are written either in Java or Kotlin, so we briefly introduce this up-and-coming language with a lab-driven approach.

We discuss the Corda ledger, shared facts and CorDapps before turning to the transaction lifecycle and flow. Finally, we look at Corda nodes and operation aspects of running a Corda network and private distributed ledger.

Upcoming course dates:
See **SCHEDULE** at **GuruTeamIRL.com** or call Neasa on **+353 (0)1 402 9423**.

GuruTeam also offer customised programmes around Blockchain, Ethereum & Corda, which can be designed for your specific projects. **Courses available in Ireland ,UK, Germany and Europe, both on and offsite.**

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About the Course Author
Ben Evans

Ben Evans, a well-known O'Reilly author and Java Champion, has been developing in financial technology for almost 15 years.

He spent 5 years at Morgan Stanley, working on project such as Google's IPO and Morgan Stanley's ground-breaking proprietary single dealer platform, Matrix. He worked in low latency FX trading at Deutsche Bank and served as Global Chief Architect for DB's Listed Derivatives division.

Ben has been working with blockchains and related technologies for several years, and has published original research on the implementation of smart contracts. He acted as consulting CTO to Giftcoin during their ICO on the Ethereum network.

He is an observer to the UK Parliament's All-Party Parliamentary Group on Blockchains and Distributed Ledgers and has been invited to give evidence to the House of Lords special interest group in the area.

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Introduction to Blockchain with Ethereum

Target Audience
Experienced programmers in a OO language (ideally Java – Javascript or C# also useful). Also suitable for architects or lead developers who are investigating suitability of blockchains.

Duration
2 Day

Prerequisites
Attendees must already be experienced programmers, ideally with knowledge of either Java, C# or Javascript. Any knowledge of blockchains, cryptography or cryptocurrencies is a notable advantage.

Software Spec
Laptop with an IDE (ideally Java 8) and the ability to install new software.

Course Outline Summary

DAY ONE

A: BLOCKCHAIN BOOTCAMP
1. **Fundamental Concepts**
   * Hashing
   * Public Key cryptography
   * Hash chaining (e.g. Git)
   * Cryptographic glossary

2. **An introductory blockchain**
   * Append-only ledgers
   * Proof of work and difficulty
   * Specification for a simple example – FirstBlockchain

   Lab: Build & implement FirstBlockchain

   Lab: Try to forge entries in someone else's implementation of FirstBlockchain

B. BITCOIN
1. **Bitcoin concepts**
   * Full nodes, mining and PoW
   * Addresses, wallets & client tools

   Lab: Setting up Bitcoin Wallets

   * Exchanges
   * Economics of Bitcoin
   * Future Directions

C. ETHEREUM
1. **Ethereum concepts**
   * Setting the Scene
   * Fundamentals: Ethereum, EVM, Smart Contracts & Gas
   * Client tools & wallets

   Lab: Setting up Ether wallets

   * How Ethereum differs from Bitcoin
   * The "Why" of Ethereum
   * Distributed apps and ICOs
   * Case Studies

DAY TWO

2. **Introduction to Solidity**
   * Meeting Solidity

   Lab: Set up your Ethereum (Rinkeby) working environment

   * Solidity types – value, reference, array
   * Keywords
   * Storage
   * Accounts and related data types
   * Functions and contracts
   * Transactions and blocks
   * Builtin functions

3. **Developing Solidity Contracts**
   * Deploying a contract to a testnet
   * Working with the JS web console

   Lab: A first Ethereum smart contract

   * Zeppelin contracts and ERC20
   * Case study: Example Production contract
   * Case studies: Pitfalls of Solidity contracts

   Lab: Building an ERC20 contract

4. **Web3j**
   * Introducing web3j
   * CompleteableFuture and Reactive design of web3j programs
   * Web3j proxies for contracts
   * Interacting with the Ethereum blockchain with Web3j
   * Integration and practical considerations

   Lab: Managing contracts on the Ethereum blockchain with web3j

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