# BLOC-4 - BLOCKCHAIN DEVELOPING ON ETHEREUM

Categoria: **Blockchain**

## INFORMAZIONI SUL CORSO

| Durata: | Categoria: | Qualifica Istruttore: | Dedicato a: | Produttore: |
|---|---|---|---|---|
| 3 Giorni | Blockchain | Docente Senior (min. 5 anni) | Sviluppatore | PCSNET |

## OBIETTIVI

Al termine del corso i partecipanti saranno in grado di:

-Approfondire i benefici e svantaggi delle tecnologie Blockchain
-Scrivere e leggere Smart Contract sicuri utilizzando il linguaggio Solidity
-Comprendere il concetto di Gas e come viene calcolato il suo costo
-Comprendere come sono strutturate le transazioni
-Comprendere ed evitare bug costosi ed errori di programmazione
-Creare applicazioni che interagiscono con gli Smart Contract
-Web3.js
-Installare, configurare e usare il framework Truffle
-Scrivere test con il framework Truffle
-Comprendere il workflow di sviluppo e deployment
-Utilizzare e creare private network, test network and the public main network

## PREREQUISITI

Ènecessario avere una conoscenza di base di JavaScript e HTML.
Èconsigliato avere una conoscenza di base di C ++ o Java, data types, git repositories.

## CONTENUTI

**Module 1 - Blockchain and Smart Contract Basics**

-What is Blockchain and how does it work?
-Centralized vs. Decentralized vs. Distributed
-Blockchain vs. Databases
-Bitcoin vs Ethereum
-What are Smart Contracts?
-How are Smart Contracts used?

**Module 2 - Smart Contract Programming Basics**

-Advantages and Drawbacks of Smart Contracts
-High-Level Language vs. Low-Level

-Smart Contracts with Solidity
-Types of Variables in Solidity
-Function/Variable Visibility
-Smart Contract Constructors
-Setter- and Getter-Functions

**Module 3 - Understanding Decentralized Information and Web3**

-Blockchain Access structures and Architectures
-Blockchain Access vs. centralized RESTful API
-Understanding Web3.js API
-Understanding Transactions and Consensus
-Private Keys, Public Keys and Signatures
-Understanding privacy on pubic Blockchains
-Understanding the architecture of KeyStore’s such as MetaMask or MIST

**Module 4 - Basics of Ethereum and the EVM**

-Ethereum Denominations
-Understanding EVM and the ABI Interface
-Calls vs. Transactions
-Concurrency and Events
-Use cases of Events
-LAB:
    -Install and Use Ganache
    -Work with Web3.js
    -Define Events
    -Listen and React to Events

**Module 5 - Solidity Advanced: Modifiers, Mappings, Structs and Inheritance**

-Understanding Functions, Mappings and Structs
-When to use Modifiers
-Libraries vs. Inheritance
-Understand and use Modifiers
-Add Mappings and Structs
-Use Inheritance to increase auditability

**Module 6 - Understanding Deployment and Costs**

-Understand Development and Deployment Cycles
-Understanding Solidity Compilation and Deployment
-Gas and Gas-Costs
-Upgradeability and Data Migration Techniques
-Understand the moving Parts: Compiler, Blockchain, API, KeyStore

**Module 7 - Mining, Proof of Work vs. Proof of Authority**

-What is Mining in PoW?
    -How blocks are generated
    -PoW vs. PoA (vs. PoS)
-Understanding Go-Ethereum or Ganache/TestRPC for local development
-Understanding Private Blockchains vs. Public Blockchains
-LAB:

- -Installing and using Ganache
- -Installing and using Go-Ethereum
- -Connecting to Ganache/Go-Ethereum from Remix and Web3.js
- -Interact with the Blockchain from HTML/JS

**Module 8 - Working in Teams, Testing and Versioning**

- -Understanding what Truffle is
- -How Manage Code for Teams
- -Understanding Migrations
- -Understanding Unit-Testing with Truffle
- -LAB:
  - -Download and Setup Truffle
  - -Adapt the standard Truffle-Project
  - -Write A Unit Test

## INFO

**Esame:** CBDE - Certified Blockchain Developer Ethereum
**Materiale didattico:** Materiale didattico in formato digitale
**Costo materiale didattico:** incluso nel prezzo del corso a Calendario
**Natura del corso:** Operativo (previsti lab su PC)