



School: ..... Campus: .....

Academic Year: ..... Subject Name: ..... Subject Code: .....

Semester: ..... Program: ..... Branch: ..... Specialization: .....

Date: .....

## **Applied and Action Learning** (Learning by Doing and Discovery)

**Name of the Experiment :** Dive into Ethereum – Clients and EVM

### **Objective/Aim:**

To understand Ethereum architecture and its clients.

To explore the working of the Ethereum Virtual Machine (EVM).

To gain hands on experience with Ethereum clients and interact with the EVM.

### **Apparatus/Software Used:**

- solidity
- Remix IDE
- Brave browser

### **Theory/Concept:**

**Ethereum:** A decentralized blockchain platform supporting smart contracts and decentralized applications.

**Ethereum clients:** software implementations of the Ethereum protocol. They allow nodes to join the Ethereum network, sync data and interact with the blockchain.

**Ethereum Virtual Machine (EVM):** A decentralized computation engine that executes smart contracts. It uses byte code, gas and opcodes to ensure deterministic execution of contracts across all nodes.

### **Accounts:**

- Externally owned accounts: controlled by private keys.
- Contract accounts: controlled by smart contract code.

**Gas:** the unit that measures the amount of computational effort required to execute operations on the EVM.

## Procedure:

Setup Ethereum client

- Install Geth or use hardhat/foundry.
- Initialize a private Ethereum test network.

Create Ethereum accounts

- Generates accounts using MetaMask.
- Fund test accounts with ether (using test net faucet).

Deploy smart contract on EVM

- Write a simple solidity smart contract.
- Compile it using solidity compiler.
- Deploy contract to the local Ethereum client or test net.

Interact with contract

- Call contract functions using web3.js or ether.js.
- Observe gas usage and transaction receipts.

Check EVM execution

- Verify the execution of bytecode storage updates on EVM.
- Monitor logs using the Ethereum client console.

## Observation Table:

The Ethereum client ran successfully, accounts were created and a smart contract was deployed. The EVM executed the contract, update values and showed gas usage and logs.

## ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
<b>Total</b>	<b>50</b>		