BLOCKCHAIN TECHNOLOGIES LAB

(Common to both CSE, CSE(DS), CSE(AI&ML))

Course Code: 20CS11S4 **L T P C**
0 0 3 1.5

Course Outcomes: At the end of the course the student shall be able to

CO1: Perform the operations on the Ethereum blockchain **(L2)**
CO2: Illustrate about Web3.js to interact with Smart Contracts **(L2)**
CO3: Creating and Deploying Hyperledger Fabric network **(L3)**
CO4: Demonstrating basic data types, operators, loops and functions in RUST **(L2)**
CO5: Demonstrate the working of random numbers and Borrowing in RUST **(L2)**

LIST OF EXPERIMENTS:

(Any 12 experiments from the following to be performed)

PROGRAMS USING SOLIDITY:

1. A) Generate Public private key pairs for Bitcoin and Ethereum addresses.
   B) Connect to the Public/Testnet Ethereum Blockchain network using popular wallets (Metamask, Brave browser) and understand various terminologies like gas, gas fee, gas price, priority fee.
   C) Send test ether from one account to another.
   D) Send test ether to smart contract.
2. Installation and Configuration of Node.js and Web3.js
3. Using Web3.js to Transfer Ether from one account to another .
4. Create a Private Ethereum Blockchain network.
5. Using Web3.js to Interact with Smart Contracts.
6. Using Web3.js with Chrome to Interact with Smart Contracts.
7. Create a Hyperledger Fabric Permissioned blockchain network.
8. Write, deploy and execute chaincode in Hyperledger Fabric network.

PROGRAMS USING RUST

9. **Basics of Rust:**
   A)Write a program to display the statements.
   B)Write a program to demonstrate the basic data types in Rust.
   C)Write a program to format strings and numbers.
   D)Write a program to compute arithmetic operations taking input from the user and display the result.

E) Write a program to demonstrate bitwise and logical operators.

F) Write a program to swap two numbers without using a temporary variable.

10. Write programs that demonstrate the Compound Data Types in Rust (Arrays, Tuples)

11. Write programs that can demonstrate the working of loops and Conditional Loops in Rust

12. Write a program that can demonstrate

A) Assigning value of one variable to another variable.

B) Passing value to a function.

C) Returning value from a function.

13. Write a program to generate a Random number using Rust

14. Write a program that can compare the guessed number with a Secret generated number

15. Write a program that can demonstrate Borrowing in Rust

TEXTBOOK:

1. Steve Klabnik and Carol Nichols, “The Rust Programming Language”.

REFERENCES:

1. Matt Zand, Xun (Brian) Wu, and Mark Anthon, “Hands-on Smart Contract Development with Hyperledger Fabric V2: Building Enterprise Blockchain Applications”, O′Reilly.