RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VIII-Semester

Departmental Elective CSIT- 802 (D) Block Chain Technology

Objective:
To understand the concept of Blockchain and its platforms- Bitcoin, Ethereum, Hyperledger and Multichain. The course provides an overview of the structure and mechanism of Blockchain.

Course Outcomes: After Completing the course student should be able to:
1. Understand blockchain architecture and requisite crypto foundation.
2. Understand various consensus protocol and their usage for their specific application.
3. Understand and Resolve security concern in blockchain.
4. Explore blockchain advances and upcoming platforms.
5. Learn to write smart contracts.
6. Understand use cases.

Unit I
Introduction and crypto foundation: Elliptic curve cryptography, ECDSA, Cryptographic hash function, SHA-256, Merkle trees, Cryptocurrencies.

Unit II
Bitcoin, Bitcoin addresses, Bitcoin blockchain, block header, mining proof of work (PoW) algorithm, difficulty adjustment algorithm, mining pools, transactions, double spending attack, The 51% attacker, block format, transaction format, Smart contacts (escrow, micropayments, decentralized lotteries), payment channels.

Unit III
Ethereum: Overview of differences between Ethereum and bitcoin, block format, mining algorithm, proof-of-stake (PoS) algorithm, account management, contracts and transactions, Solidity language, decentralized application using Ethereum.

Unit IV
Smart Contracts Different Blockchains and Consensus mechanisms.

UNIT V
Blockchain and Security R3, CORDA and Hyperledger System architecture, ledger format, chain code, transaction flow and ordering, private channels, membership service providers, case studies**.**

Recommended Books:

1. Mastering Bitcoin:Unblocking Digital Cryptocurrencies, by Andreas Antonopoulos.
2. Mastering Ethereum, Antonopoulos, Andreas M. and Wood, O'Reilly Media,Inc.,2018
3. An Introduction to Bitcoin, V. Saravanan, Lecture Notes.
4. Bitcoin and Cryptocurrencies Technologies: A Comprehensive Introduction, Arvind Narayanan, Princeton University Press(July 19,2016)ISBN-10:0691171696.

List of Experiments:

1. To Create a first block in blockchain
2. To encrypt a block using Sha 256 Encryption Algorithm
3. To Mine a Block in Blockchain
4. To authenticate a mined block using consensus algorithm'
5. To implement proof of work
6. To secure a block using encryption
7. To create a simple cryptocurrency
8. To write a smart contract in solidity