RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, VI-Semester

Open Elective AD 604 (B) Block Chain Technologies

Unit-I
Introduction: Overview of Block chain, Public Ledgers, Bit coin, Smart Contracts, Block in a Block chain, Transactions, Distributed Consensus, Public vs Private Block chain,Understanding Crypto currency to Block chain, Permissioned Model of Block chain,Overview of Security aspects of Block chain; Basic Crypto Primitives: Cryptographic HashFunction, Properties of a hash function, Hash pointer and Merkle tree, Digital Signature,Public Key Cryptography, A basic crypto currency

Unit-II
Understanding Block chain with Crypto currency: Bit coin and Block chain: Creation ofcoins, Payments and double spending, Bit coin Scripts, Bit coin P2P Network, Transaction inBit coin Network, Block Mining, Block propagation and block relay. Working withConsensus in Bit coin: Distributed consensus in open environments, Consensus in a Bitcoinnetwork, Proof of Work (PoW) – basic introduction, Hash Cash PoW, Bit coin PoW, Attackson PoW and the monopoly problem, Proof of Stake, Proof of Burn and Proof of ElapsedTime, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

Unit-III
Understanding Block chain for Enterprises: Permissioned Block chain: Permissioned model and use cases, Design issues for Permissioned block chains, Execute contracts, State machinereplication, Overview of Consensus models for permissioned block chain-Distributedconsensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem,Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT overAsynchronous systems.

Unit-IV
Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), Food Security, Mortgage over Block chain, Block chain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, and Identity on Block chain

Unit-V
Block chain application development: Hyperledger Fabric- Architecture, Identities andPolicies, Membership and Access Control, Channels, Transaction Validation, Writing smartcontract using Hyperledger Fabric, Writing smart contract using Ethereum, Overview ofRipple and Corda

References:
1. Melanie Swan, "Block Chain: Blueprint for a New Economy", O'Reilly, 2015

2. Josh Thompsons, "Block Chain: The Block Chain for Beginners- Guide to BlockchainTechnology and Leveraging Block Chain Programming"

3. Daniel Drescher, "Block Chain Basics", Apress; 1stedition, 2017

4. Anshul Kaushik, "Block Chain and Crypto Currencies", Khanna Publishing House, Delhi.

5.Imran Bashir, "Mastering Block Chain: Distributed Ledger Technology, Decentralization andSmart Contracts Explained", Packt Publishing

6. Ritesh Modi, "Solidity Programming Essentials: A Beginner's Guide to Build SmartContractsfor Ethereum and Block Chain", Packt Publishing

7. Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd,VenkatramanRamakrishna, "Hands-On Block Chain with Hyperledger: BuildingDecentralized Applications with Hyperledger Fabric and Composer", Import, 2018