

24MCAE304: BLOCK CHAIN MANAGEMENT

Hours/Week: 3
Credits: 3

I.A. Marks: 30
Exam. Marks: 70

Course Learning Objectives:

- Basics of block chain management and Fundamentals of the design principles of Bitcoin and Ethereum.
 - Advantages of Block chain over distributed computing.
 - Solutions of soft computing algorithms for optimization.
 - Designing, building and deploying smart contracts and distributed applications.
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Course Outcomes: After completing the course, the students will be able to,

CO1: Understand the fundamentals of the design principles of Bitcoin and Ethereum.

CO2: Explain the Simplified Payment Verification protocol.

CO3: Interact with a block chain system by sending and reading transactions.

CO4: Evaluate the solutions of soft computing algorithms for optimization.

CO5: Design build and deploy smart contracts and distributed applications.

CO6: Easily Analyze regulations of crypto currency.

CO7: Evaluate roots of bitcoin and the applications of crypto currency.

UNIT-I

9 Hrs.

Basics of Block Chain Management, Distributed Database, Two General Problem, Byzantine General Problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete, Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

UNIT-II

9 Hrs.

Blockchain: Introduction, Advantage over Conventional Distributed Database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public Blockchain.

UNIT-III

9 Hrs.

Distributed Consensus: Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate. Crypto currency: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin.

UNIT-IV

9 Hrs.

Crypto Currency Regulations: Stakeholders, Roots of Bit Coin, Legal Aspects-Crypto Currency Exchange, Black Market and Global Economy. Applications: Internet of Things, Medical Record Management System, Domain Name Service and Future of Blockchain.

REFERENCE BOOKS:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press, 2016.
2. Antonopoulos, Mastering .Bitcoin: Unlocking Digital Cryptocurrencies
3. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
4. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger," Yellow paper, 2014.
5. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts.