24CSS305: BLOCK CHAIN MANAGEMENT

Hours/Week: 4 I.A. Marks: 30

Credits: 4 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.

Course Outcomes: After completing the course, the students will be able to,

- Understand the fundamentals of the design principles of Bitcoin and Ethereum.
- Explain the Simplified Payment Verification protocol.
- Interact with a block chain system by sending and reading transactions.
- Evaluate the solutions of soft computing algorithms for optimization.
- Design build and deploy smart contracts and distributed applications.
- Easily Analyze regulations of crypto currency.
- Evaluate roots of bitcoin and the applications of crypto currency.

UNIT-I **12Hrs.**

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, MemoryHard Algorithm, Zero Knowledge Proof.

UNIT-II **12Hrs.**

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 **12Hrs.**

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 **12Hrs.**

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 TizianaCimoli, A survey of attacks on Ethereum smart contracts.