Sardar Patel Institute of Technology, Mumbai-400058

OEIT1- Blockchain Technology and Applications

Academic Year 2023-2024

Subject Incharge- Dayanand Ambawade

Consolidated Syllabus: MSE Syllabus

Module/Topic	Syllabus	Keywords	References
Fundamentals of Blockchain	Blockchain Basic, Four Core building blocks of blockchain, the Life cycle of Blockchain, Blockchain working, Difference between blockchain and databases, Centralized, Decentralized and Distributed system, Distributed Ledger Technology, Blockchain ecosystem and structure, Features of Blockchain, Advantages of Blockchain. Blockchain Primitives- Cryptography, PKI, Hash functions, properties of Hash Functions, Merkle Tree, Zero Knowledge Proof (ZKP), z-SNARK	Block, Blockchain, Genesis Block, Decentralized, Distributed, Ledger, Immutability, Cryptographically Secure, Append-only, Linked List, Distributed database, Proof-of-Work (PoW), Proof-of-Stake (PoS), SHA-256, Nonce, Timestamp, Public-key Cryptography, Trust, Tracking, Fraud, tamper resistance, Public Permissionless, Private Permissioned, Mining, Miner, Nodes, Full Nodes, Lite Node, Archives, Linked List,	[1] Imran Bashir Chapter-1 Blockchain 101 https://classroom.google.com/c/NjU0Mjc0MjMyNjQw/m/NjQ3MTU3MDE5NjIy/details

		Cryptography, PKI, Cryptographic Hash Functions, Merkle Tree, ZKP	
Cryptocurrency-Bitcoin	History of Cryptocurrency, Cryptography in blockchain, Hash Functions, SHA hash Function, Merkle Tree, Digital Signatures, How does bitcoin transaction works,	Bitcoin, Monetary Policy, The Halving, Block Frequency, Bitcoin Ecosystem, Bitcoin Network, Bitcoin Mining, Mining Pool, Mining Systems-CPU, GPU, FPGA and ASIC, Nonce range, Timestamp, Wallet, Wallet Address, Bitcoin Network Payment and API, Bitcoin-core, bitcoind, bitcoin-cli, bitcoin-qt	[1]Imran Bashir Chapter 6,7 https://classroom.google.com/c/NjU0Mjc0MjMyNjQw/m/NjQ3MTU3MDE5NjIy/details
Ethereum Ecosystem	Introduction to ethereum, Ethereum Technology Stack, Ethereum Virtual Machine (EVM) - Advantages and Drawbacks of ethereum,	Ethereum Characteristics, Vitalik Buterin, Types of Ethereum, Ethereum Network, Nodes, Smart contract, Solidity, Consensus, Gas, Gas Price, Gas Limit, Out of Gas, Mining, DApps, EVM,	Refer [1] Imran Bashir Chapter 9: Ethereum Architecture Chapter 10: Ethereum in Practice https://classroom.google.com/c/NjU0Mjc0MjMyNjQw/m/NjU4Nzg3MDQ1ODA5/details

	Smart Contract, ether, solidity Wallets for Ethereum - Solidity - Smart Contracts - some attacks on smart contracts. Solidity Programming: https://classroom.google.com/c/NjU0Mjc0MjMyNjQw/m/NjU4Nzg3MzAwNDQ3/details	DAOs, NFTs, ERC721, ERC20, DeFi,	Refer [1] Chapter 11: Tools, Languages, and Frameworks for Ethereum Developers https://classroom.google.com/c/NjU0Mjc0MjMyNjQw/m/NjU4Nzg3MzAwNDQ3/details
	Blockchain: Enterprise use cases. NFTs, DeFi,		https://classroom.google.com/c/NjU0Mjc0MjMyNjQw/m/NjU4Nzg3MzAwNDQ3/details

Book References:

[1] Mastering Blockchain, 4th Edition by Imran Bashir, Packt Publications

[2] Blockchain in Action by Beena Ramamurthy, Manning Publications.
Chapter-1, Chapter-2, Chapter-3