

SILVER OAK UNIVERSITY



College of Technology
Bachelor of Technology
Information Technology

Course Name: Fundamentals of Blockchain Technology

Course Code: 1010103437

Semester: 7th

Prerequisite:

Basics of Cryptography, Network security ,Hashing.

Course Objectives:

1. Understand the Fundamentals of Blockchain Technology.
2. Explore Practical Applications and Use Cases.
3. Develop Hands-on Skills in Blockchain Development.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
3	0	2	5	4

Contents:

Unit	Topics	Teaching Hours	Weightage %
1	BASICS OF BLOCKCHAIN: Introduction, Origin of Blockchain, A typical block structure, Blockchain solution, Components of Blockchain, Block in Blockchain. Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol. Crypto currency: Bit coin, Altcoin, Token: Introduction, Bitcoin and the cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrency, Cryptocurrency usage.	6	10
2	TYPES OF BLOCKCHAIN: Public Blockchain system, Private Blockchain system, Consortium Blockchain.	5	10
3	CONSENSUS: Why consensus, Importance of consensus in transactions, Distributed consensus, Consensus in Synchronous and Asynchronous systems, Consensus in Bitcoin, Proof of Work (Pow) Protocol. Attacks: Double spending, Sybil, DoS. Other consensus mechanism: Proof of Stake, Proof of Burn, Proof of Elapsed Time, PBFT (Practical Byzantine Fault Tolerance), DBFT (Delegated Byzantine Fault Tolerance).	8	15

4	CONTRACTS / ETHEREUM: Introduction, History, Architecture, Working of Smart contract, Challenges. Types of smart contracts, Amount types, gas, transactions, Ethereum smart contract, Ethereum VM, Solidity, Limitations, Demo of Running and Debugging Smart Contracts in Remix. (Detailed), Writing smart contracts using Solidity & JavaScript, Deploy and Debug Smart Contract using appropriate tool.	8	20
5	CRYPTOCURRENCY: Introduction, Cryptocurrency Basics, wallets, Types of Cryptocurrency. Crypto-economics and Cryptocurrency Transactions, Valid and Invalid Transactions, Cryptocurrency Wallets, Buying Cryptocurrency Wallets, Withdrawal Cryptocurrency Wallets. Bitcoin, Ethereum basic crypto primitives: Hash, Digital Signatures, Hash chain to Blockchain, Basic consensus mechanisms Ethereum Vs Bitcoin. Working of Bitcoin System, Decentralized Cryptocurrency and its use cases. Bitcoin Wallets. Cryptocurrency safety issues.	7	20
6	BLOCKCHAIN USE CASES: Crowd funding, Compliance to KYC, International Trade finance, Supply Chain Management. Mining: What is mining, Mining Difficulty, Miner, Mining pool, Mining pool methods.	4	15
7	BLOCKCHAIN APPLICATIONS AND TRENDS: Blockchain Applications like healthcare, Supply Chain Management, Finance, Digital ID's. Real Time Use Cases and Applications in Blockchain. Blockchain in Financial Service (Payments and Secure Trading, Compliance and Mortgage, Financial Trade). Blockchain in Government: Advantages, Use Cases. Future trends in Blockchain, industry impact. Impact of Blockchain on Business.	4	10

Course Outcomes:

Sr. No.	CO Statement	Unit
CO-1	Recognize the Fundamental Cryptography that Determines Blockchain Technology.	1
CO-2	Describe various Blockchain Technologies	2
CO-3	Discuss Applications and use cases related to Blockchain, along with possible implementations.	4,6
CO-4	Identify cryptocurrency and experienced several forms of attacks used in real-time on Blockchain.	3,5
CO-5	Design and evaluate Blockchain-based application	7

Teaching & Learning Methodology:

1. Problem-based Learning
2. Design Thinking
3. Cooperative Learning.
4. Competency-based Learning

