



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3171618

Semester – VII

Subject Name: Blockchain

Type of course: Open Elective

Prerequisite: Cryptography

Rationale: Blockchain helps to manage and secure data as a record with their digital relationships in a decentralized manner. With blockchain technology, there is no need for a central authority and two parties can securely conduct communication with one another at a faster pace. Blockchain makes the Transaction transparent by keeping the chain of records.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Fundamentals of Blockchain: Introduction, Origin of Blockchain, Blockchain solution, Components of Blockchain, Block in Blockchain, The Technology Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol Cryptocurrency – Bitcoin, Altcoin, Token: Introduction, Bitcoin and the cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrency, Cryptocurrency usage	6
2	Public Blockchain System: Introduction, Public Blockchain, Popular public Blockchain, The Bitcoin Blockchain, Ethereum Blockchain Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry	7
3	Private Blockchain System: Introduction, Key characteristics of Private Blockchain, Private Blockchain Examples, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, Byzantine Fault	5
4	Consortium Blockchain Introduction, Key characteristics of Consortium Blockchain, Hyperledger platform, Overview of Ripple, Overview of Corda	5



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5	Applications of Blockchain: Introduction, Blockchain in Education, Blockchain in Healthcare	3
6	Limitations and Challenges of Blockchain Blockchain Implementation – Limitation, Challenges	2

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	50	10	0	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Blockchain Technology By Chandramouli Subramanian, Asha George, Abhilash K A and Meena Karthikeyan , Universities Press Publication
2. Blockchain Blueprint for a New Economy, By Melanie Swan, O'Reilly Publication
3. Blockchain For Dummies By Tiana Laurence, Wiley Publication

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Explain different types of Blockchain	45
CO-2	Describe Consensus algorithms for decentralized network architecture	25
CO-3	Explain the support of Blockchain technology in a cryptocurrency or Digital currency.	15
CO-4	Use the Blockchain technology for given application.	15

List of Experiments:

1) Ethereum – With respect to Ethereum, carry out following :

- Install Geth Client & Configure Ethereum Nodes
- Manage Accounts and Account states.
- Enable Mining and checking balance in Ether
- Setting up Metamask and Testing Fund Transfer – work with Ethereum Ecosystem



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- Add Parameters to Cryptocurrency
 - Check Balance Before Transfer
 - Adding Transfer Event for Logging
- 2) Hyperledger - **With respect to Hyperledger, carry out following :**
- Installing Hyperledger Fabric(latest version)
 - Build Network with Network configuration
 - Hyperledger Fabric Demo
- 3) Corda - **With respect to Corda, carry out following :**
- Corda – Setting up the Environment
 - Building the Corda Network