GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Integrated MSc, 9th Semester
Branch: Information Technology
Subject Name: Blockchain Technology
Subject Code: 1390503

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (I)	ESE(V)	
3	0	2	4	70	30	20	30	150

Content:

Sr. No.	Content	Teaching Hours	Module Weightage (%)
1.	**Basic of Blockchain** **Basics of Block chain :** Introduction, concepts of blockchain, Definition, fundamentals and characteristics of block chain, consensus in Trust building Exercises, Public, private and Hybrid Block chains, Distributed Ledger technologies, DLT decentralized applications and databases, Architecture of Block chain, Transactions, Chaining Blocks, Value Proposition of Blockchain Technology. **Decentralized System:** Distributed Decentralized databases, decentralized enterprise, Decentralization, Disintermediation **Hash Functions**: Introduction, hashing, Message Authentication code, Secure Hash Algorithms (SHA-1), SHA Version 3, Distributed hash tables, Hasing and Data Structures, Hashing in Blockchain Mining **Consensus:** Approach and Algorithms , Byzantine Agreement Methods	9	15%
2.	**Blockchain Components** Introduction, Etherium (EtheriumVirual Machine, Clients, Key Pairs, Addresses, Wallets, Transactions, Languages and Development Tools). **Cryptography:** Introduction, Primitive, Symmetric and Asymmetric cryptography	8	20%
3.	**Smart Contracts** Introduction, smart contracts, Absolute immutable, contractual confidentiality, Law implementation and sentiment, characteristics, IoT, Utilities (Smart grid), Proofs of origin, Supply chain management, Medical sciences, Finance, Media and entertainment, Public services, Legal Services, Darknet	8	25%

4.	**Bitcoins**: Introduction, Working of Bitcoin, Merkle Trees, Bitcoin Block Structures, Bitcoin Address, Bitcoin Transactions, Bitcoin Network, BitcoinWallets, BitcoinPayments, Bitcoinclients, Bitcoinsupply	7	15%
5.	**Blockchain Applications and Allied Technologies** **Blockchain applications**: Block chain in Insurance, Block chain in Healthcare, Life insurance and Claim Processing in Case of Death, Asset Management, Financial Institutional Assets, Smart Assets, Electronic currency, Manufacturing **Blockchain and Allied Technologies**: Blockchain and Cloud computing, Blockchain and Artificial Intelligence, Blockchain and IoT, Blockchain and Machine Learning, Blockchain and Robotic process automation	8	25%

Reference Books:

1. Blockchain Technology - Concepts and Applications: Kumar Saurabh, Ashutosh Saxena, First Edition, Wiley
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press, July, 2016
3. Imran Bashir , Mastering Blockchain 2nd Edition, , PACKT Publication
4. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.
5. Bikramaditya Singhal, Gautam Dhameja and Priyansu Sekhar Panda,Beginning Blockchain, A Beginner's Guide to Building Blockchain Solutions, Apress, 2018
6. EladElrom, TheBlockchain Developer, A Practical Guide for Designing, Implementing, Publishing, Testing, and Securing Distributed Blockchain-based Projects, Apress, 2019

Course Outcome:

After learning the course, the students should be able to:

No.	CO statement
CO-1	Student will learn principles and techniques associated with blockchain technologies, they will become familiar with the cryptographic building blocks.
CO-2	Develop a practical understanding of how cryptocurrencies are implemented and the practical limitations of currently available blockchain and cryptocurrency systems.
CO-3	Apply hyperledger Fabric and Etherum platform to implement the Block chain Application
CO-4	Student will learn typical cryptocurrency such as Bitcoin
CO-5	Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain