GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Cyber Security

Subject Code: ME02059081

Course/Subject Name: Blockcahin Technology and Cyber security

WEF Academic Year	2024-25
Semester	2
Category of the Course	Professional Elective Course

Prerequisite:	Basic understanding of computer fundamental concepts and programming.
Rationale:	• The course provide an insight of blockchain technology and concepts. • The course focus on to gain the knowledge about the practical use of blockchain applications.

Course Outcome:

After completion of the Course, Students will be able to:

No	Course Outcomes	RBT Level*
01	Understand the fundamental concepts of blockchain technology.	UN
02	Apply the blockchain for business applications.	AP
03	Apply the blockchain for technology, legal and governance applications.	AP
04	Analyse the various available private blockchain platforms.	AN
05	Evaluate various blockchain challenges for real world applications.	EL

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Teaching and Examination Scheme:

Teaching Scheme (in hours)			Total Credits (L+T+PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/Practical		
L	T	PR	C	ESE (E)	PA/CA (M)	PA/CA (I)	ESE (V)	
03	00	02	04	70	30	20	30	150

Course Content:

Unit	Course Content	No of Hours	% of Weightage
1	**UNIT-I: Introduction** Introduction to Blockchain, Types of Blockchain - Public Blockchains, Consortium Blockchains, Private Blockchains. Blockchain Implementations - Bitcoin, Namecoin, Ripple, Ethereum, Blockchain Collaborative Implementations - Hyperledger, Corda, Currency and Tokens, Cryptocurrency, Digital Tokens.	6	10
2	**UNIT-II: Blockchain in Cybersecurity** A Taxonomy of Blockchain Threats and Vulnerabilities, Distributed Ledger Technologies – Blockchain vs. Hashgraph, Blockchain Security and use cases in Cybersecurity, Cyber security Risk Analysis with Blockchain Technology. Attack surfaces in blockchains.	8	20
3	**UNIT-III: Blockchain Technology in digital forensic** Blockchain Technology in digital evidence collection, storage and retrieval, Anti-Counterfeit Solutions in Blockchain, Evidence analysis and establishment from crime scene with Blockchain Technology, Privacy Preservation.	8	20
4	**UNIT-IV: Blockchain platforms and access control systems** Various types of Blockchain Platforms, Private Blockchain Use Cases, Alpha Point Distributed Ledger Platform, Chain Core, Corda, Domus Tower, The Elements Project, HydraChain, Hyperledge, Stellar, Access control mechanism and techniques.	7	20
5	**UNIT-V: Multi-chain Deployment and Decentralized Services** Multi-chain Deployment over Smart Contracts to Enhance Security Blockchain for Decentralized Services, Enchainsg Security and Performance of Distributed IPFS-based Web Applications, Blockchain Governance Challenges, Challenges in Smart Contracts.	8	20
6	**UNIT-VI: Future advancements** AI and Blockchain for Cyber space, Blockchain for growing economics, Adaptability of secure crypto currencies, Quantum Computing for Blockchain.	8	10
	TOTAL	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	**20**	**20**	**20**	**20**	**10**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

Reference/Suggested Learning Resources:

(a) Books:

1. Blockchain Applications in Cybersecurity Solutions by R. Agrawal, N. Gupta Bentham Books.
2. Blockchain Cybersecurity, Trust and Privacy by Kim-Kwang Raymond Choo, Ali Dehghantanha, Reza M. Parizi, Springer.
3. Blockchain Enabled Applications by Vikram Dillon, David Metcalf, Max Hooper, Apress.
4. Hands-On Blockchain with Hyperledger, Nitin Gaur et al., Packt Publishing.

(b) Open source software and website

- Course-related online MOOCs on NPTEL/SWAYAM platform.
- Recently Published papers/articles in reputed journals.

Suggested Course Practical List:

- The practical work will be carried out based on the content covered during the academic sessions**.**

List of Laboratory/Learning Resources Required: Programming development environment (open source is encouraged) related to the course content.

Suggested Project List: The subject teacher has to assign the relevant project work to the students in individual/team.

Suggested Activities for Students: The subject teacher has to assign the outcome based activities to the students in individual/team.

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