

SEMESTER – VII

SUBJECT: BlockChain and Crypto currency

Subject Code	20CSE742	CIE Marks	50
Hours/Week (L: T: P)	3:0:0	SEE Marks	50
Total Hours	40	Examination Hours	3
No. of Credits: 3			

Course Learning Objectives:

The course will enable students to:

CLO1	Understand the basic terminologies of cryptography
CLO2	Understand how Blockchain systems (mainly Bitcoin and Ethereum) work.
CLO3	Explain alternative blockchains and Decentralized applications.
CLO4	Understand various applications of Blockchain.

CONTENTS	# of Hours / RBT Levels
MODULE-1 Basics of Blockchain: Concepts of Blockchain, definition, fundamentals, characteristics, consensus, public, private, and hybrid blockchain, distributed ledger technologies, applications, architecture, transactions, chaining, the value proposition of blockchain. Decentralized system: Introduction, distributed decentralized databases, decentralized enterprise, decentralization, disintermediation, decentralized enterprise regulation. Text Book1: Chapter 1, 2	8 (L2)
MODULE-2 Hash functions: Hashing, message authentication code, Secure Hash Algorithm (SHA-1), Secure Hash Algorithm Version-3(SHA-3), distributed hash tables, hashing and data structures, and hashing in blockchain mining. Cryptography: Cryptography, cryptography primitives, symmetric cryptography, asymmetric cryptography, Elliptic Curve Digital Signature Algorithm. Text Book1: Chapter 3, 6 Text Book2: Chapter 4	8 (L2)
MODULE-3 Consensus: Consensus algorithms, Byzantine agreement methods. Blockchain components: Ethereum, EVM, working of Ethereum, Ethereum clients, key pairs, addresses, wallets, transactions, Ethereum languages, Ethereum development tools. Text Book1: Chapter 4, 5	8 (L2)

MODULE-4	8 (L2)
<p>Smart contracts: Smart contracts, Supply chain management, public services, Finance.</p> <p>Bitcoins: Working of bitcoins, Merkle trees, bitcoin block structures, bitcoin address, bitcoin transactions, bitcoin networks, bitcoin wallets, bitcoin payments, bitcoin clients, bitcoin supply.</p> <p>Text Book1: Chapter 7, 8</p>	
MODULE-5	8 (L2)
<p>Decentralized applications: Qualification of blockchain Dapps, service quality assurance, design decisions, whisper elements, acceptance blockades, swarm, blockchain forks.</p> <p>Alternative Blockchains: Kadena, Ripple, Storj , BigchainDB, Eris.</p> <p>Notable Blockchain case studies: Zcash on Ethereum, Bitcoin-NG, Falcon, Bletchley.</p> <p>Text Book1: Chapter 9, Text Book2: Chapter16</p>	

Course Outcomes: Upon successful completion of this course, student will be able to

CO741.1	Summarize the terminologies and types of BlockChain.
CO741.2	Integrate various cryptographic algorithms in to BlockChain.
CO741.3	Implement Ethereum BlockChain using various tools and frameworks learnt.
CO741.4	Enumerate the Bitcoin features and its protocols.
CO741.5	Discuss about alternative block chains available and various applications of BlockChain .

Textbooks:

1. Blockchain Technology-Concepts and Applications,Kumar Saurabh,Ashutosh Saxena,Wiley emerging technology series,2020.
2. Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Author- Imran Bashir, Packt Publishing Ltd, Second Edition, 2017.

Reference Books:

1. Bitcoin and Cryptocurrency Technologies, Author- Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Princeton University, 2016 Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
2. DR. Gavin Wood, ``ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.
3. Arshdeep Bahga, Vijay Madisetti, "Blockchain Applications: A Hands-On Approach", VPT, 2017.

E-Books / Web References

1. [Mastering Bitcoin: Programming the Open Blockchain-oreilly-2nd-edition-2017 \(PDF\) \(pdfroom.com\)](#)
2. [Understanding Cryptography's role in Blockchains | Comparitech](#)

Mapping of CO-PO:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO742.1	3	2	1	-	-	1	-	-	-	-	-	-	-	3
CO742.2	3	2	1	-	-	1	-	2	-	-	-	-	-	3
CO742.3	3	2	1	-	-	1	-	3	-	-	-	-	-	3
CO742.4	3	3	1	2	1	1	1	3	-	-	-	-	-	3
CO742.5	3	-	1	-	1	1	1	3	-	-	-	-	-	3
Average	3	3	1	2	1	1	1	3	-	-	-	-	-	3

Low-1: Medium-2: High-3

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