

BLOCK CHAIN TECHNOLOGY

Course Code	23CS4701B	Year	IV	Semester	I
Course Category	Professional Elective-IV	Branch	CSE	Course Type	Theory
Credits	3	L – T – P	3-0-0	Prerequisites	-N/A-
Continuous Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to:		
CO1	Understand the fundamentals, structure, and types of blockchain, including cryptocurrencies and consensus mechanisms.	L2
CO2	Develop and demonstrate smart contracts using Ethereum and analyze use of blockchain in public, private, and consortium models.	L3
CO3	Apply blockchain technologies to real-world use cases, including banking, education, healthcare, and supply chain.	L3
CO4	Analyze security, privacy, and ethical implications of blockchain applications in various domains.	L4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2												
CO2			3		3								3
CO3	3		3										3
CO4		3											
Avg.	2.5	3	3		3								3

Syllabus		
Unit No.	CONTENTS	Mapped CO
I	Fundamentals of Block chain: Introduction, Origin of Block chain, Block chain Solution, Components of Block chain, Block in a Block chain, The Technology and the Future. Block chain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Block chain, Consensus Protocol. Cryptocurrency: Bitcoin, Altcoin and Token: Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage.	CO1
II	Public Block chain System: Introduction, Public Block chain, Popular Public Block chains, The Bitcoin Block chain, Ethereum Block chain. 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.	CO1, CO2

III	Private Block chain System: Introduction, Key Characteristics of Private Block chain, Private Block chain, Private Block chain Examples, Private Block chain and Open Source, E-commerce Site Example, Various Commands (Instructions) in E-commerce Block chain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Block chain, Byzantine Fault, Multichain. Consortium Block chain: Introduction, Key Characteristics of Consortium Block chain, Need of Consortium Block chain, Hyperledger Platform, Overview of Ripple, Overview of Corda. Introduction to Initial Coin Offering	CO1, CO2
IV	Security in Block chain: Introduction, Security Aspects in Bitcoin, Security and Privacy Challenges of Block chain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Block chain Smart Contract (DApp), Security Aspects in Hyperledger Fabric. Applications of Block chain: Introduction, Block chain in Banking and Finance, Block chain in Education, Block chain in Energy, Block chain in Healthcare, Block chain in Real-estate, Block chain in Supply Chain, The Block chain and IoT. Limitations and Challenges of Block chain.	CO3, CO4
V	Block chain Case Studies: Case Study 1 – Retail, Case Study 2 – Banking and Financial Services, Case Study 3 – Healthcare, Case Study 4 – Energy and Utilities. Blockchain Ethereum Platform using Solidity	CO2, CO3

Learning Resources	
Text Books	
1. “Block chain Technology”, Chandramouli Subramanian, Asha A.George, Abhilasj K A and Meena Karthikeyan , Universities Press.	
Reference Books	
1. Block chain Blue print for Economy, Melanie Swan, SPD Oreilly. 2. Block chain for Business, Jai Singh Arun, Jerry Cuomo, Nitin Gaur, Pearson Addition Wesley 3. Mastering block chain- Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, Third Edition, Packt Publishing Ltd	
E-Resources & other digital material	
• https://codingbootcamps.io/resources/learn-blockchain-online-resources/ • https://www.vestinda.com/blog/blockchain/top-7-resources-for-learning-blockchain-and-crypto • https://www.blockchain-council.org/blockchain/the-complete-blockchain-developer-resource-list/ • https://docs.soliditylang.org/en/v0.8.30/	