PVP20

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Data Science)

IV B.Tech I Semester

Block Chain Technologies

Course Code	**20DS4701B**	**Year**	IV	**Semester**	I
Course Category	**PEC**	**Branch**	CSE (Data Science)	**Course Type**	Theory
Credits	**3**	**L-T-P**	3-0-0	**Prerequisites**	Computer Networks
Continuous Internal Evaluation	**30**	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon Successful completion of course, the student will be able to		
CO1	Describe blockchain fundamentals and use cases to understand its role and impact in decentralized systems.	**L2**
CO2	Apply cryptographic and decentralization techniques to secure blockchain transactions and validate cryptocurrencies.	**L3**
CO3	Utilize smart contract solutions on Ethereum to implement secure and efficient applications in sectors such as healthcare, finance, and IoT.	**L3**
CO4	Analyze the architectures of Bitcoin and Ethereum to evaluate their impact on emerging industry applications.	**L4**

Contribution of course outcomes towards achievement of program outcomes & Strength of correlations (3: Substantial,2: Moderate,1: Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PSO1	PSO2
CO1	2												
CO2	3												
CO3	3												
CO4		3									2		

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Syllabus		
Unit No	**Contents**	**Mapped CO**
I	**Block chain 101**: Distributed systems, History of Block chain and bitcoin, Introduction to Block chain, types of blockchain-Distributed ledger, public block chains, private block chains, fully private and proprietary blockchains, tokenized and token less blockchains. Consensus, features, CAP theorem and blockchain, Benefits and limitations of blockchain	CO1
II	**Decentralization and Cryptography**: Decentralization using blockchain, Methods of decentralization- Disintermediation, context driven decentralization, Routes to decentralization, Decentralized organizations. Blockchain and full ecosystem decentralization, Platforms for decentralization	CO1, CO2
III	**Cryptography and Technical Foundations**: Cryptographic Primitives-Symmetric key cryptography-stream ciphers, Block ciphers Asymmetric cryptography, Public and private keys-RSA, Hash functions **Introducing Bitcoin**: Overview, Cryptographic keys, transactions-transaction life cycle, transaction data structure, types of transactions, transaction verification, Blockchain-structure of a block, structure of a block header, Mining.	CO1, CO2, CO4
IV	**Smart Contracts**: Definition, Ricardian Contracts-Smart Contract Templates, Oracles, Deploying Smart Contracts **Ethereum 101:** Overview, The Ethereum Network-Mainnet, Testnet, Privatenet. Components of the Ethereum Ecosystem-Keys and addresses, Accounts, Transactions and messages, The Ethereum Virtual Machine.	CO1, CO3, CO4
V	**Hyper ledger**: Overview-Fabric, Sawtooth Lake, Iroha, Burrow, Indy, Explorer, Cello, Composer. Hyperledger Fabric-Membership Services, Block chain Services, consensus services, Distributed Ledger. **Blockchain-Outside of Currencies**: Internet of Things, Government, Health, Finance, Media.	CO1, CO3, CO4

Learning Resources
Text Books
1.Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, 2nd edition,2017, Packt Publishing Ltd.
References
1. Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, 2016, Princeton University 2. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Daniel Drescher, 1st Edition, 2017, Apress 3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, 1st Edition, 2014 O'Reilly Media.
E-Recourses and other Digital Material
1. https://www.coursera.org/specializations/blockchain 2. https://nptel.ac.in/courses/106105184/ 1.