		L	T	P	Credits	Total Marks
SCSA4007	DESIGN AND DEVELOPMENT OF BLOCKCHAIN	3	0	0	3	100

COURSE OBJECTIVES

- To understand how blockchain works in terms of Bitcoin and Ethereum.
- To learn about the various decentralized blockchain.
- To know the differences between proof of work and stake.
- To design and build own blockchain.
- To integrate own ideas with blockchain using Ethereum Wallet and Smart Contract.

UNIT1 BLOCKCHAIN BASICS 9Hrs.

Basics of Crypto economics- Blockchain – Cryptocurrencies overloaded –Blockchain in Nutshell: Benefits and Challenges – Blockchain types - Blockchain Peer to Peer Network: Consensus Mechanisms, Proof of Work, Proof of Stake, Mining Layer, Propagation Layer, Semantic Layer, Application Layer

UNIT2 COMPONENETS AND STRUCTURE OF BLOCKCHAIN 9Hrs.

Blocks – Chain between the blocks – Digital signatures and Hashing – Block data examples: Bitcoin block, Ethereum block, Block time and Block size, Global Size – Blockchain miners and validators – Blockchain speed: Blockchain throughput and comparison with traditional network

UNIT3DECENTRALIZATION USING BLOCKCHAIN 9Hrs.

Methods of decentralization – Routes to decentralization – Blockchain and full ecosystem decentralization: Computation, Storage, Communication and decentralization – Smart Contracts – Organization of decentralization: Decentralized Autonomous: Organizations, Corporations, Societies, DApps and their requirements, Operations of DApps – Example of DApps: KYC-Chains, Open Bazzar, Lazooz

UNIT4 CREATING AN OWN BLOCK CHAIN 9Hrs.

Creating: Basic P2P network, Genesis Blocks and Sharing Blocks – Registering Miners and Creating new blocks – Storing blocks – Creating: Blockchain wallet, API, Command Line Interface – Blockchain Wallet and Transaction: Wallet, Transaction and Colored Coins

UNIT5ETHEREUM WALLET & SMART CONTRACT 9Hrs.

Ganache Full node Client – Intellij Plugin for Solidity – Truffle Suite: Create your Smart Contract – Connect Truffle to Smart Contract – Smart Contract: Hello world, MD5 Smart Contract, Smart Contract with truffle, Deploy the Smart Contract to your deployment network – Truffle Console – Operation with your Smart Contract via the Truffle CLI – Cryptocurrency Mining: Mining Hardware, Miner Types, Mining Pools, Mining Software

Max. 45 Hrs.

COURSE OUTCOMES

CO1: Understanding emerging technology models of blockchain

CO2: Known to deal with the component and structure of blockchain

CO3: Deals to work with various decentralized blockchain

CO4: Familiar with Ethereum wallet and smart contract

CO5: Applications and implementation strategies

CO6: Design and develop own blockchain for a real time application

TEXT /REFERENCE BOOKS

1. EladElrom,"The Blockchain Developer A Practical Guide for Designing, Implementing, Publishing, Testing, and Securing Distributed Blockchain-based Projects",Apress (2019)
2. Brenn Hill, Samanyu Chopra, Paul Valencourt, Narayan Prusty, "Blockchain Developer's Guide Develop Smart Applications with Blockchain Technologies - Ethereum, JavaScript, Hyperledger Fabric, and Corda",Packt Publishing (2018)
3. Salman A. Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, "Hands-On Blockchain with Hyperledger Building Decentralized Applications with Hyperledger Fabric and Composer", Packt Publishing (2018)
4. Imran Bashir, Narayan Prusty, "Advanced Blockchain Development Build Highly Secure, Decentralized Applications and

Conduct Secure Transactions",Packt Publishing (2019)

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100 **Exam Duration : 3 Hrs.**

PART A : 10 Questions of 2 marks each-No choice	**20 Marks**
PART B : 2 Questions from each unit with internal choice, each carrying 16 marks	**80 Marks**