Professional Elective - II

Course Title : Block Chain Technology			
Course Code: P18CS641	**Semester : 6th**	**L:T:P: H - 2 : 2 : 0**	**Credits: 3**
Contact Period : Lecture :52 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

Course Content

Unit-1

Introduction: Basic Cryptographic primitives used in Blockchain – Secure, Collison-resistanthash functions, digital signature, public key cryptosystems, zero-knowledge proof systems. Needfor Distributed Record Keeping, Modelling faults and adversaries, Byzantine Generals problem, Consensus algorithms and their scalability problems.

Self Study Component: Why Nakamoto Came up with Blockchain based cryptocurrency?

11 Hours

Unit-2

Technologies Borrowed in Blockchain – hash pointers, Consensus, Byzantine Models of fault tolerance, digital cash etc. Bitcoinblockchain - Wallet - Blocks - Merkley Tree - hardness of mining - transaction verifiability - anonymity - forks - double spending - mathematical analysis of properties of Bitcoin.

Self Study Component: Bitcoin challenges and solutions.

11 Hours

Unit-3

Abstract Models for BLOCKCHAIN - GARAY model - RLA Model - Proof of Work (PoW) as random oracle - formal treatment of consistency, liveness and fairness - Proof of Stake (PoS) based Chains - Hybrid models (PoW + PoS).

Self Study Component: Bitcoin scripting language and their use.

10 Hours

Unit-4

Ethereum - Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity – Smart Contracts - The Turing Completeness of Smart Contract Languages and verification challenges, Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts.

Self Study Component: Some attacks on smart contracts.

10 Hours

Unit-5

Hyperledger fabric, the plug and play platform and mechanisms in permissioned blockchain. Beyond Cryptocurrency – applications of blockchain in cyber security, integrity of Information, E-Governance and other contract enforcement mechanisms. Limitations of blockchain as a technology.

Self Study Component**:** myths vs. reality of blockchain technology.

10 Hours

Text Books :

1. Blockchain Technology: Cryptocurrency and Applications, S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, Oxford University, Press, 2019
2. Bitcoin and cryptocurrency technologies : a comprehensive introduction, Arvind Narayanan et. Al., Princeton University press, 2016

Reference Book :

1. Blockchain : The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming, Josh Thompson, Create space independent publishing platform, 2017.

Course Outcomes :

1. Define and Explain the fundamentals of Blockchain
2. Illustrate the technologies of blockchain
3. Describe the models of blockchain
4. Analyze and demonstrate the Ethereum
5. Analyze and demonstrate Hyper ledger fabric

Course Articulation Matrix(CAM)														
Course Outcomes (CO's)	**Program Outcomes(PO's)**												**PSO's**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO1	3	3	1	2	1								1	2
CO2	3	3	2	2	2								1	2
CO3	3	3	2	2	2								1	2
CO4	3	3	2	2	2								1	2
CO5	3	3	2	2	2								1	2