VALUE ADDED COURSE

Programme Code:		M.Sc CS	**Programme Title:**		Master of Science (Computer Science)	
Course Code:	23PCS2VA1	**Course Title:**	**VACI:**23PCS2VA1- Foundations and Applications of Blockchain Technology and Cryptocurrency		**Batch :**	2023-2025
Lecture Hrs./Week Or Practical Hrs./Week		1	**Total Hours**	30	**Semester:**	II
					Credits:	2

Course Objective

To impart knowledge on Block chain and Crypto currency and make the students to design, build and deploy distributed applications by integrating the ideas from Block chain technology.

Course Outcomes (CO)

On successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the basics of cryptography.	K1
CO2	Understand emerging abstract models for Blockchain technology.	K2
CO3	Design, build, and deploy a distributed application.	K3
CO4	Analyze the differences between proof-of-work and proof-of-stake consensus.	K4
CO5	Evaluate security, privacy, and efficiency of a Blockchain system.	K5

MAPPING

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1O	PSO1	PSO 2
CO1	H	M	H	M	M	H	H	M	M	H	M	M
CO2	H	M	M	H	H	M	M	M	M	H	H	M
CO3	H	H	H	M	M	M	M	M	M	H	M	M
CO4	H	H	H	H	M	H	M	M	M	M	H	M
CO5	H	H	M	H	M	H	M	H	M	M	H	M

H: High; M: Medium; L: Low.

Units	Contents	Hrs
UNIT I	**Basics:** Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. **Cryptography:** Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof. **Blockchain:** Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee,Anonymity,Reward,ChainPolicy,LifeofBlockchainapplication,Soft&HardFork,Private and Public Blockchain.	10
UNIT II	**Distributed Consensus:** Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate. **Cryptocurrency:** *History*, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin.	10
UNIT III	**Cryptocurrency Regulation:** Stakeholders, *Roots of Bit coin*, Legal Aspects-Crypto currency	10

	Exchange, Black Market and Global Economy. **Applications:** Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.	
	Total Contact Hours	**30**

Pedagogy and Assessment Methods:
Direct Instruction, Flipped Class, Digital Presentation, Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/EDITION	YEAR OF PUBICATION
1	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder.	Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction	Princeton University Press	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Joseph Bonneau et al, SoK	Research perspectives and challenges for Bitcoin and cryptocurrency	IEEE Symposium on security and Privacy	2015
2	Dr. Gavin Wood	ETHEREUM: A Secure Decentralized Transaction Ledger	Yellow paper	2014
3	William Mougayar	Business Blockchain Promise, Practice and Application of the Next Internet Technology	John Wiley & Sons	2016

Web References

1. https://www.tutorialspoint.com/blockchain/index.htm
2. https://www.javatpoint.com/blockchain-cryptocurrency
3. https://www.udemy.com/course/introduction-to-cryptocurrencies/
4. https://www.simplilearn.com/tutorials/blockchain-tutorial/blockchain-technology
5. https://www.coursera.org/learn/cryptocurrency

Course Designed by	Verified by HOD	Checked by	Approved by
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