

**NIRMA UNIVERSITY**

<b>Institute:</b>	Institute of Technology
<b>Name of Programme:</b>	Integrated B.Tech.(CSE)-MBA
<b>Course Code:</b>	CSI0804
<b>Course Title:</b>	Blockchain Technology
<b>Course Type:</b>	Core
<b>Year of Introduction:</b>	2021-22

**Credit Scheme**

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**Course Learning Outcomes (CLO):**

At the end of the course, students will be able to –

1. summarize the concept of Blockchain technology
2. develop the structure of a Blockchain network
3. evaluate security issues relating to Blockchain and cryptocurrency
4. design the applications based on Blockchain technology

**Syllabus:**

**Total Teaching hours: 20**

Unit	Syllabus	Teaching hours
Unit-I	<b>Introduction to Blockchain:</b> Need, Blockchain 1.0 to 5.0, types of blockchain, Generic elements of a blockchain, digital money to distributed ledgers, design primitives, protocols, security, consensus, permissions, and privacy.	04
Unit-II	<b>Blockchain Architecture, Design and Consensus:</b> Basic crypto primitives: hash, signature, hash chain to Blockchain, basic consensus mechanisms, requirements for the consensus protocol for permission less environment, PoW, PoS, PoB, PoET, and scalability aspects of Blockchain consensus protocols.	05
Unit-III	<b>Permissioned and Public Blockchains:</b> Design goals, Consensus protocols for Permissioned Blockchains, Hyperledger Fabric, Decomposing the consensus process, Hyperledger fabric components, Smart Contracts, Chain code design, Hybrid models (PoS and PoW)	08
Unit-IV	<b>Blockchain cryptography:</b> Different techniques for Blockchain cryptography, privacy and security of Blockchain, multi-sig concept	03

**Self-Study:** The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

**Suggested Readings/References:**

1. Narayanan, Arvind. et al, Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press.
2. Wattenhofer, Roger, The science of the blockchain, CreateSpace Independent Publishing Platform.

3. Bahga, Arshdeep, and Vijay Madiseti,. Blockchain Applications: A Hands-on Approach, VPT.
4. Nakamoto, Satoshi, Bitcoin: A peer-to-peer electronic cash system, Research Paper.
5. Antonopoulos, Andreas M, Mastering Bitcoin: Programming the open blockchain, O'Reilly Media, Inc.
6. Diedrich, Henning, Ethereum: Blockchains, digital assets, smart contracts, decentralized autonomous organizations, Wildfire Publishing (Sydney).
7. Draft version of “S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, ‘Blockchain Technology: Cryptocurrency and Applications’, Oxford University Press.
8. Josh Thompson, ‘Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming’, Create Space Independent Publishing Platform.

Suggested List of Experiments: -NA-

Suggested Case List: -NA-