**21WN727 Introduction to Blockchain and Distributed Ledger Technology 2-0-1-3**

Module 1 (**Theory**): Introduction to Blockchain technologies, types of blockchain networks (Private, Public & Hybrid), State Machine Design, Overview of Bitcoin, Ethereum, Hyperledger, IOTA DLT. Entities in Blockchain, Consensus Mechanism and algorithms, Smart Contracts, Cryptocurrency, Mining and Ledger. Applications of Blockchain in various verticals such as DeFi, Healthcare, Smart Energy, IoT, Supply chain, and NFTs. The future of Blockchain.

Module 2 (**Lab/Hands-on**): Smart Contracts basics, Setup Ethereum virtual machines (EVM), Introduction to solidity language and Remix IDE. Developing smart contracts and deploying on EVM. Hands-on applications such as eVoting, Healthcare records, etc.

Module 3 (**Application Development/Term Project**): Students choose an area and propose blockchain-based applications. Applications are further enhanced and possible PoC deployment.

**Prerequisites:**

1. Any programming language – Python or JavaScript

**Textbooks/References:**


1. Bitcoin: A Peer-to-Peer Electronic Cash System - Satoshi Nakamoto - https://bitcoin.org/bitcoin.pdf
2. Blockchain for Dummies – Manav Guptha - Wiley - http://gunkelweb.com/coms465/texts/ibm_blockchain.pdf
3. Blockchain for Beginners – Bryan Ford - https://bford.info/log/2016/1102-cybsec-blockchain.pdf
4. https://github.com/BlockchainBooks/blockchainbooks.github.io


**Course Outcomes:**

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| CO1. Students learn basic concepts of blockchain technology. |
| CO2. Students will understand different types of blockchain networks and identify where to use these. |

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| CO3. Students will get an opportunity to develop blockchain technology-based solutions in various use cases. |
| CO4. Students will learn to develop smart contracts and deploy them. |

**Prerequisites:**

1. Any programming language – Python or JavaScript or C
2. Basic knowledge of IoT (Good to have but not mandatory)

**Textbooks/References:**


1. Bitcoin: A Peer-to-Peer Electronic Cash System – Satoshi Nakamoto – https://bitcoin.org/bitcoin.pdf
2. Blockchain for Dummies – Manav Guptha - Wiley - http://gunkelweb.com/coms465/texts/ibm_blockchain.pdf
3. Blockchain for Beginners – Bryan Ford - https://bford.info/log/2016/1102-cybsec-blockchain.pdf
4. Open source references – https://github.com/BlockchainBooks/blockchainbooks.github.io
5. Handson Resources – https://github.com/saishibu/Blockchain-Course-for-Amrita


**CO – PO Affinity Map**

| PO / CO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS0 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 | PSO 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 3 | 1 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 1 | 2 | 3 | 3 |
| CO 2 | 3 | 1 | 3 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 3 |
| CO 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 3 |
| CO 4 | 3 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 3 |

3-strong, 2-moderate, 1-weak