

**BCE-P717
BLOCKCHAIN****MM : 100**
Time : 3 hrs
L T P
3 0 0**Sessional : 30**
ESE : 70
Credits 3**PREREQUISITE:** None.**COURSE OBJECTIVES**

The objective of this course is to provide conceptual understanding of block chain technology and how it can be used in Industry 4.0 The course covers the technological underpinning of block Chain operations in both theoretical and practical implementation of solutions using Ethereum.

COURSE OUTCOMES

At the end of this course, the students will be able to:

- Understand block chain technology.
- Understand Cryptocurrency
- Understand Smart contract
- Use Remix IDE
- Develop block chain based solutions and write smart contract using Ethereum Framework.
- Deploy Decentralized Application

NOTE: The question paper shall consist of two sections A and B. Section A contains 10 short type questions of 6 marks each and student shall be required to attempt any five questions. Section B contains 8 long type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus.

UNIT-I

Introduction: Overview of Block chain, History of Blockchain, Peer to Peer Network, Smart Contract, Wallet , Digital Currency, Ledgers, Types of Blockchain Platfrom .

UNIT-II

Consensus Mechanism: Permissioned Blockchain, Permissionless Blockchain , Different Consensus Mechanism- Proof of Work, Proof of Stake, Proof of Activity, Proof of Burn, Proof of Elapsed Time, Proof of Authority, Proof of Importance.



UNIT – III

Crypto currency and Wallet(With Practical Exercise): Types of Wallet, Desktop Wallet, App based Wallet, Browser based wallet, Metamask, Creating a account in Metamask, Use of faucet to fund wallet, transfer of cryptocurrency in metamask.

UNIT – IV

Smart contract and Ethereum(With Practical Exercise): Overview of Ethereum, Writing Smart Contract in Solidity, Remix IDE , Different networks of ethereum, understanding blocks practically at blockhca.in.com, how to compile and deploy smart contract in remix.

UNIT – V

Understanding Hyperledger Fabric: Overview of Open source Hyperledger project, Hyperledger Fabric- Architecture, Identities and Policies, Membership and Access Control, Channels, Transaction Validation, Writing smart contract using Hyperledger Fabric.

Use Cases

Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), Food Security, Block chain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Identity on Block chain, Blockchain in energy sector, Blockchain in governance.

TEXT BOOKS:

- Bettina Warburg, Bill Wanger and Tom Serres, Basics of Blockchain (1 ed.), Independently published, 2019. ISBN 978-1089919445.
- Herbert Jones, Blockchain (1 ed.), CreateSpace Independent Publishing Platform, 2017. ISBN 978-1977971708.
- Larry A. DiMatteo, Michel Cannarsa, Cristina Poncib, The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms (1 ed.), Cambridge University Press, 2019. ISBN 978-1108492560.

SUGGESTED READINGS :

- Antonopoulos and Andreas M., Mastering Bitcoin: unlocking digital cryptocurrencies (1 ed.), O'Reilly Media, Inc., 2015. ISBN 978-1449374044.
- Gaur and Nitin, Hands-On Blockchain with Hyperledger: Building decentralized applications with Hyperledger Fabric an (1 ed.), Packt Publishing Ltd, 2018. ISBN 978-1788994521

