

COURSE TITLE	BLOCKCHAIN TECHNOLOGY
COURSE CODE	01CO0308
COURSE CREDITS	3

Objective:

- 1 This course is intended to study the basics of Blockchain technology. During this course, learners will explore various aspects of Blockchain technology like application in various domains. By implementing learners will have ideas about private and public Blockchain, and smart contracts.

Course Outcomes: After completion of this course, student will be able to:

- 1 Understand and explore the working of Blockchain technology (Understanding)
- 2 Analyze the working of Smart Contracts (Analyze)
- 3 Understand and analyze the working of Hyperledger (Analyze).
- 4 Apply the learning of solidity and de-centralized apps on Ethereum (Apply).

Pre-requisite of course: Cryptography, Data Structure, Networking, OOP

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Introduction of Cryptography and Blockchain What is Blockchain, Blockchain Technology Mechanisms & Networks,, Blockchain Origins, Objective of Blockchain,, Blockchain Challenges,, Transactions And Blocks, P2P Systems, Keys As Identity, Digital Signatures, Hashing, and public key cryptosystems,, private vs. public Blockchain.	8
2	BitCoin and Cryptocurrency What is Bitcoin, The Bitcoin Network,, The Bitcoin Mining Process, Mining Developments, Bitcoin Wallets,, Decentralization and Hard Forks,, Ethereum Virtual Machine (EVM), Merkle Tree,, Double-Spend Problem, Blockchain And Digital Currency,, Transactional Blocks,, Impact Of Blockchain Technology On Cryptocurrency.	8
3	Introduction to Ethereum What is Ethereum, Introduction to Ethereum, Consensus Mechanisms, How Smart Contracts Work, Metamask Setup, Ethereum Accounts, Receiving Ether's What's a Transaction?,, Smart Contracts	8

Contents : Unit	Topics	Contact Hours
4	Introduction to Hyperledger What is Hyperledger? Distributed Ledger Technology & its Challenges,, Hyperledger & Distributed Ledger Technology,, Hyperledger Fabric, Hyperledger Composer	8
5	Solidity Programming: Solidity Language of Smart Contracts, Installing Solidity & Ethereum Wallet, Basics of Solidity, Layout of a Solidity Source File & Structure of Smart Contracts, General Value Types (Int, Real, String, Bytes, Arrays, Mapping, Enum, address), Blockchain Applications: Internet of Things, Medical Record Management System, Domain Name Service and Future of Blockchain, Alt Coins. 10 24%	10
Total Hours		42

Textbook :

- 1 Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction,, Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder,, Princeton University Press, 2016

References:

- 1 Mastering Bitcoin, Mastering Bitcoin, Andreas M. Antonopoulos, O'Reilly Media, 2017
- 2 Mastering Ethereum, Mastering Ethereum, Andreas M. Antonopoulos, Gavin Wood Ph.D., O'Reilly Media, 2018
- 3 Blockchain Basics, Blockchain Basics, Daniel Drescher, Apress, 2017

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
5.00	10.00	15.00	30.00	20.00	30.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Instructional Method:

- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

- 1 <https://nptel.ac.in/courses/106/104/106104220/#>
- 2 <https://www.udemy.com/course/build-your-blockchain-az/>
- 3 <https://eduxlabs.com/courses/blockchaintechnologytraining/?tab=tab-curriculum>