



SOCIETY OF ST. FRANCIS XAVIER, PILAR'S
FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

(Approved by AICTE & Affiliated to University of Mumbai)

Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.

Phone : (022) 6711 4000, 6711 4101, 6711 4104

Website : www.frcrce.ac.in • Email : crce@fragnel.edu.in

Artificial Intelligence and Data Science

(Academic Year : 2023-2024)

Course Code: CSDO7022	
Course Name: Blockchain Technology	
Course Teacher: Aditi Malkar	
Course Outcomes (CO): <i>At the End of the course students will be able to</i>	
CO.1	Describe the basic concept of Blockchain and Distributed Ledger Technology.
CO.2	Interpret the knowledge of the Bitcoin network, nodes, keys, wallets and transactions
CO.3	Implement smart contracts in Ethereum using different development frameworks.
CO.4	Develop applications in permissioned Hyperledger Fabric network.
CO.5	Interpret different Crypto assets and Crypto currencies
CO.6	Analyze the use of Blockchain with AI, IoT and Cyber Security using case studies.



SOCIETY OF ST. FRANCIS XAVIER, PILAR'S
FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

(Approved by AICTE & Affiliated to University of Mumbai)

Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.

Phone : (022) 6711 4000, 6711 4101, 6711 4104

Website : www.frcrce.ac.in • Email : crce@fragnel.edu.in

Course Lesson Plan

Sr. No.	Proposed Date	Topics	Delivery Mode	CO	Assessment Tool	Ref. book	Actual Date	Remark
1	18/7	Information about syllabus, assessment and course outcomes.	Lecture	--	--			
2	19/7	Distributed Ledger Technologies - Introduction to blockchain History	Lecture	CO1	UT1, Q1, A1	T1, R3		
3	20/7	Evolution, fundamentals concepts	Lecture	CO1	UT1, Q1, A1	T1, R3		
4	26/7	Components, types	Lecture	CO1	UT1, Q1, A1	T1, R3		
5	27/7	Block in a Blockchain: Structure of a Block, Block Header Hash and Block Height, The Genesis Block	Lecture	CO1	UT1, Q1, A1	T1, R3		Online Taken
6	28/7	Linking Blocks in the Blockchain, Merkle Tree	Lecture	CO1	UT1, Q1, A1	T1, R3		
7	2/8	Consensus: Byzantine Generals Problem, consensus algorithms: PoW, PoS	Lecture	CO2	UT1, Q1, A1	T1, R3		
8	3/8	PoET, PoA, LPoS, pBFT, Proof-of-Burn (PoB)	Lecture	CO2	UT1, Q1, A1	T1, R3		
9	4/8	Life of a miner, Mining difficulty, Mining pool and its methods	Lecture	CO2	UT1, Q1, A1	T1, R3		
10	9/8	Bitcoin: What is Bitcoin, history of Bitcoin, Bitcoin Common terminologies: keys, addresses and nodes	Lecture	CO2	UT1, Q1, A1	R1, R4		
11	10/8	Bitcoin mining, hashcash, Block propagation and relay	Lecture	CO2	UT1, Q1, A1	R1, R4		
12	11/8	Bitcoin scripts, Transactions in the bitcoin network	Lecture	CO2	UT1, Q1, A1	R1, R4		
13	16/8	Assignment-1: Presentation & Group Discussion	Lecture + GD	CO2	UT1, Q1, A1			
14	17/8	Ethereum: History, Components, Architecture of Ethereum, Consensus, Miner and mining node	Lecture	CO3	UT1, Q1, A1	T5, R2		
15	18/8	Ethereum virtual machine, Ether, Gas, Transactions, Accounts, Patricia Merkle Tree, Swarm, Whisper and IPFS	Lecture	CO3	UT1, Q1, A1	T5, R2		
16	23/8	Complete transaction working and steps in Ethereum, Case study of Ganache for Ethereum blockchain	Lecture	CO3	UT1, Q1, A1	T5, R2		



SOCIETY OF ST. FRANCIS XAVIER, PILAR'S
FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

(Approved by AICTE & Affiliated to University of Mumbai)

Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.

Phone : (022) 6711 4000, 6711 4101, 6711 4104

Website : www.frcce.ac.in • Email : crce@fragnel.edu.in

17	24/8	Exploring etherscan.io and ether block structure, Comparison between Bitcoin and Ethereum	Lecture	CO3	UT1, Q1, A1	T5, R2		
18	25/8	Smart Contracts: history, characteristics, working of smart contracts, types, Oracles, Structure & Limitations	Lecture	CO3	UT1, Q1, A1	T5, R2		
19	30/8	Solidity programming: set-up tools and installation, Basics, functions, Visibility and Activity Qualifiers, Ethereum networks	Lecture	CO3	UT1, Q1, A1	T2		
20	31/8	Solidity compiler, solidity files and structure of contracts, data types, storages, array, functions	Lecture	CO3	UT1, Q1, A1	T2		
21	31/8	Developing and executing smart contracts in Ethereum. Smart Contracts Use cases, Opportunities and Risk	Lecture	CO3	UT1, Q1, A1	T5, R2		
22	1/9	Remedial Session						
23	6/9	Introduction to Private Blockchain	Lecture	CO4	UT2, Q2, A2	T1, R3		
24	7/9	Key characteristics, need	Lecture	CO4	UT2, Q2, A2	T1, R3		
25	8/9	Examples of Private and Consortium blockchains	Lecture	CO4	UT2, Q2, A2	T1, R3		
26	13/9	Smart contracts in private blockchain	Lecture	CO4	UT2, Q2, A2	T1, R3		
27	14/9	Introduction to Hyperledger, Tools and Frameworks	Lecture	CO4	UT2, Q2, A2	T3, R3		
28	15/9	Hyperledger Fabric, Comparison between Hyperledger Fabric & Other Technologies, Hyperledger Platform	Lecture	CO4	UT2, Q2, A2	T3, R3		
29	20/9	Paxos and Raft consensus, Ripple and Corda blockchains	Lecture	CO4	UT2, Q2, A2	T3, R3		
30	21/9	Byzantine Faults: Byzantine Fault Tolerant (BFT) and Practical BFT	Lecture	CO4	UT2, Q2, A2	T1, R3		
31	22/9	Cryptocurrency basics, types, usage, ERC20 and ERC721 Tokens, comparison between ERC20 & ERC721	Lecture	CO5	UT2, Q2, A2	T4		
	28/9	Anant Chaturdashi						
32	29/9	ICO: basics and related terms, launching an ICO, pros and cons, evolution and platforms, STO, Different Crypto currencies	Lecture	CO5	UT2, Q2, A2	T4		
33	4/10	Defi, Metaverse, Types of cryptocurrencies, Bitcoin, Altcoin, and Tokens (Utility and Security), Cryptocurrency	Lecture	CO5	UT2, Q2, A2	T4		



SOCIETY OF ST. FRANCIS XAVIER, PILAR'S
FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

(Approved by AICTE & Affiliated to University of Mumbai)

Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.

Phone : (022) 6711 4000, 6711 4101, 6711 4104

Website : www.frcrce.ac.in • Email : crce@fragnel.edu.in

34	5/10	Wallets: Hot and cold wallets, Cryptocurrency usage, Transactions in Blockchain, UTXO and double spending problem	Lecture	CO5	UT2, Q2, A2	T4		
35	6/10	Applications of Blockchain: Various domains including Education	Lecture	CO6	UT2, Q2, A2	T1, R3		
36	11/10	Energy, Healthcare	Lecture	CO6	UT2, Q2, A2	T1, R3		
37	12/10	Real-estate, logistics, supply chain	Lecture	CO6	UT2, Q2, A2	T1, R3		
38	13/10	Tools: Corda, Ripple	Lecture	CO6	UT2, Q2, A2	T1, R3		
39	18/10	Quorum and other Emerging Blockchain Platforms	Lecture	CO6	UT2, Q2, A2	T1, R3		
40	19/10	Case Study on any of the Blockchain Platforms	Lecture	CO6	UT2, Q2, A2	T1, R3		
41	20/10	Assignment-2, Course Exit Survey						
42	25/10	Remedial Session						
		University ESE Examination						

Text Books :

1. Blockchain Technology, Chandramouli Subramanian, Asha A George, Abhilash K. A and Meena Karthikeyen, Universities press.
2. Solidity Programming Essentials: A beginner's Guide to Build Smart Contracts for Ethereum and Blockchain, Ritesh Modi, Packt publication
3. Hyperledger Fabric In-Depth: Learn, Build and Deploy Blockchain Applications Using Hyperledger Fabric, Ashwani Kumar, BPB publications
4. Cryptoassets: The Innovative Guide to Bitcoin and Beyond, Chris Burniske & Jack Tatar.
5. Mastering Ethereum, Building Smart Contract and Dapps, Andreas M. Antonopoulos Dr. Gavin Wood, O'reilly

Reference Books :

1. Mastering Bitcoin, programming the open 2nd Edition by Andreas M. Antonopoulos, June 2017, Publisher(s): O'Reilly Media, Inc. ISBN: 9781491954386.
2. Mastering Ethereum, Building Smart Contract and Dapps, Andreas M. Antonopoulos Dr. Gavin Wood, O'reilly.
3. Blockchain Technology: Concepts and Applications, Kumar Saurabh and Ashutosh Saxena, Wiley Publication.
4. The Basics of Bitcoins and Blockchains: An Introduction to Cryptocurrencies and the Technology that Powers Them, Antony Lewis. for Ethereum and Blockchain, Ritesh Modi, Packt publication. University of Mumbai, B. E. (Information Technology), Rev 2016 276

Course Instructor: Aditi Malkar