CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2020-21

Programme: **Bachelor of Engineering (Information Technology)**

Semester: **VII**

Course Code: **102046703**

Course Title: **Blockchain**

Course Group: **Professional Elective Course - III**

Course Objectives: This course explores the fundamentals of the public, transparent, secure, immutable, and distributed database called Blockchain. This course will introduce students to the working and applications of the blockchain technology that is gaining popularity to record and transfer digital assets.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	2	4	40 / 14	60 / 21	20 / 7	30 / 10	150 / 52

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction to Blockchain:** Fundamentals of Blockchains Technology, The Structure of Blockchains, Blockchain Applications, The Blockchain Life Cycle,Distributed Ledger vs Centralized System, Merkel Root, Nonce Value, Hash Algorithm, and its applications.	07
2	**Cryptocurrency – Bitcoin, Altcoin and Token:** Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage	05
3	**Blockchain Types and Consensus mechanism:** Introduction, Decentralization and Distributed system, Types of Blockchain: Public Blockchain,Private Blockchain and Consortium Blockchain, Consensus Protocol: POW, POS, POC, POB, BFT and PBFT	06
4	**Smart Contracts:** Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart Contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry	07

5	**Encountering the Ethereum Blockchain:** History of Ethereum, Ethereum: The Open-Source Worldwide Computer, Decentralized Applications, Decentralized Autonomous Organizations, hacking a Blockchain, The cryptocurrency Ether Getting Up and Running on Ethereum Mining for Ether, Setting up your Ethereum Wallet, Building Your First (DAO) Decentralized Autonomous Organization, Test net and Congress, Governance and Voting, Uncovering the Future of DAOs, Building Smarter Smart Contracts	**06**
6	**Security and applications of Blockchain:** Security Aspects in Bitcoin, Security and Privacy Challenges of Blockchain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Blockchain Smart Contract (DApp)Application of Blockchain: Banking and Finance,Education,Energy,Healthcare,Supply Chain,The Blockchain and IoT	**06**
	Total	**37**

List of Practicals / Tutorials:

1	Study and perform practical on Cryptography algorithm for securing data.
2	Study and implement about Bitcoin Structure and Design.
3	Study and design your own Cryptocurrency.
4	Study and Install Bitcoin Wallet.
5	Study and understand the basics of Solidity language.
6	Implement Smart contact and run it using application tool.
7	Study about Hyperledger Composer.
8	Study about Hyperledger Fabric.
9	Install IPFS locally on our machine, initialize your node, view the nodes in network and add files and directories install Swarm and run any test file.
10	Building a Private Ethereum Network and Deploying Smart Contract & Security.
11	Study and apply real life application of Blockchain.
12	Case study OR Mini Project on blockchain technology.

Reference Books:

1	Blockchain Technology By Chandramouli Subramanian, Asha George, Abhilash K A and Meena Karthikeyan , Universities Press Publication
2	Blockchain Blueprint for a New Economy, By Melanie Swan,O'Reilly Publication
3	Blockchain For Dummies By Tiana Laurence, Wiley Publication

Supplementary learning material:	
1	NPTEL - Swayam Courses
2	IBM Tools
3	Coursera

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
15%	25%	25%	15%	20%	---	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Illustrate the concepts of Bitcoin and their usage.	**16**
CO-2	Understand the basic concepts and technology used for blockchain.	**26**
CO-3	Interact with a blockchain system by sending and reading transactions.	**24**
CO-4	Design, build, and deploy smart contracts and distributed applications.	**20**
CO-5	Evaluate security, privacy, and efficiency of a given blockchain system.	**14**

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	June-2020
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025