



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

BLOCKCHAIN TECHNOLOGIES								
<b>II Semester: CSE</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSE26	Core	L 0	T 0	P 4	C 2	CIA 40	SEE 60	Total 100
<b>Contact Classes: Nil</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: 42</b>			<b>Total Classes:42</b>			
<b>Prerequisites: Cryptography and Network Security</b>								

### I. COURSE OVERVIEW:

The course on Blockchain Technology typically covers topics related to the fundamentals, applications, and implementation of blockchain. Blockchain technology is an attractive option for industries looking to enhance security, efficiency, and transparency in their operations.

### II. COURSE OBJECTIVES:

The students will try to learn:

- I. The fundamentals of blockchain and various types of blockchain and consensus mechanisms.
- II. The public blockchain system, Private blockchain system, and consortium blockchain.
- III. The security issues of blockchain technology in the area of algorithmic design.

### III. COURSE OUTCOMES:

After successful completion of the course, students will be able to:

- CO1 Summarize the concepts of blockchain technology.
- CO2 Apply the blockchain for business applications.
- CO3 Apply the blockchain for technology, legal, and governance applications.
- CO4 Analyze the various available private blockchain platforms.
- CO5 Evaluate various blockchain challenges for real-world applications.
- CO6 Analyze the security and privacy challenges of blockchain and Hyperledger fabric

#### **IV. COURSE CONTENT:**

##### **MODULE-I: INTRODUCTION (9)**

Introduction to Blockchain, Types of Blockchain - Public Blockchains, Consortium Blockchains, Private Blockchains. Blockchain Implementations -Bitcoin, Name coin, Ripple, Ethereum, Blockchain Collaborative Implementations - Hyperledger, Corda, Categories of Blockchain, Private Blockchain Use Cases, Private Blockchain Technology, Alpha Point Distributed Ledger Platform, Chain Core, Corda, Domus Tower, The Elements Project, Hydra Chain, Hyper ledger, Stellar

##### **MODULE-II: BLOCKCHAIN BUSINESS USE CASES (9)**

Currency and Tokens, Cryptocurrency, Digital Tokens, Financial Services Use Cases viz. Know Your Customer (KYC) Use Case, Asset Management Settlement Use Case, Insurance Claims Processing Use Case, Trade Finance (Supply Chain) Use Case, Global Payments Use Case, Smart Property, Smart Contracts on the Blockchain.

##### **MODULE-III: PRIVATE BLOCKCHAIN SYSTEM (9)**

Introduction, Key Characteristics of Private Blockchain, Why We Need Private Blockchain, Private Blockchain Examples, Private Blockchain and Open Source, E-commerce Site Example, Various Commands (Instructions) in E-commerce Blockchain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, Byzantine Fault, Multichain.

**Consortium Blockchain:** Introduction, Key Characteristics of Consortium Blockchain, Why We Need Consortium Blockchain, Hyperledger Platform, Overview of Ripple, Overview of Corda.

##### **MODULE-IV: SECURITY IN BLOCKCHAIN (9)**

Introduction, 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), Security Aspects in Hyperledger Fabric.

##### **MODULE-V: APPLICATIONS OF BLOCKCHAIN (9)**

Introduction, Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Energy, Blockchain in Healthcare, Blockchain in Real Estate, Blockchain in Supply Chain, The Blockchain and IoT. Limitations and Challenges of Blockchain

Compliance, regulations, and legal considerations in the blockchain space. Impact of blockchain on industries and existing legal frameworks.

#### **V. TEXTBOOKS:**

1. Chandramouli Subramanian, Asha A. George, Abhilash K A and Meena Karthikeyan “Blockchain Technology”, Universities Press, 2018.
2. Arshdeep Bahga, Vijay Madisetti, “Blockchain Applications: A Hands-On Approach”, VPT Books, 2017.

#### **VI. REFERENCE BOOKS:**

1. Joseph J. Bambara and Paul R. Allen “Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions”, McGraw-Hill Education, 2017.
2. Hands-On Blockchain with Hyperledger, Nitin Gaur et al., Packt Publishing.

#### **VII. WEB REFERENCES:**

1. <https://nptel.ac.in/courses/106105184/>
2. <https://medium.com/moatcoin/part-6-blockchain-simplified-notes-nptel-892f13875555>
3. <http://www.hands-on-books-series.com/assets/Bahga-Madisetti-Blockchain-Book-Code.zip>

### **VIII. E-TEXTBOOKS:**

1. [https://www.researchgate.net/publication/345045424\\_BLOCKCHAIN\\_FUNDAMENTALS\\_TEXT\\_BOOK\\_Fundamentals\\_of\\_Blockchain](https://www.researchgate.net/publication/345045424_BLOCKCHAIN_FUNDAMENTALS_TEXT_BOOK_Fundamentals_of_Blockchain)
2. <https://www.blockchainexpert.uk/book/blockchain-book.pdf>
3. [https://users.cs.fiu.edu/~prabakar/cen5079/Common/textbooks/Mastering\\_Blockchain\\_2nd\\_Edition.pdf](https://users.cs.fiu.edu/~prabakar/cen5079/Common/textbooks/Mastering_Blockchain_2nd_Edition.pdf)

### **IX. MATERIALS ONLINE:**

12. Course Outline Description
13. Tutorial question bank
14. Tech talk topics
15. Open-ended experiments
16. Definitions and terminology
17. Assignments
18. Model question paper – I
19. Model question paper – II
20. Lecture notes
21. PowerPoint presentation
22. E-Learning Readiness Videos (ELRV)