



MARRI LAXMAN REDDY

INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

BLOCKCHAIN TECHNOLOGY								
VIII Semester: CSE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
24X0540	Professional Electives (PE)	3	0	0	3	40	60	100
Contact Classes: 48	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 48			
Prerequisites: cryptography and Network security, Computer Networks								

Course Overview:

The Blockchain Technology course introduces students to the fundamentals, history, and components of blockchain, along with its potential for solving traditional system problems. It covers various blockchain types, including public, private, and consortium networks, and explains consensus mechanisms such as Proof of Work and Proof of Stake. The course explores cryptocurrencies like Bitcoin, altcoins, and tokens, their usage, and role in digital finance. Public blockchains such as Bitcoin and Ethereum are studied in detail, along with smart contracts, their types, characteristics, and industrial applications. Private and consortium blockchains are analyzed, including Hyperledger, Ripple, and Corda platforms, permissioned algorithms, and use-cases like e-commerce. Initial Coin Offerings (ICOs) are explained, including their process, benefits, and risks. Security and privacy challenges of blockchain are covered, including identity management, D App safeguarding, and performance concerns. Applications across banking, finance, healthcare, energy, real estate, supply chain, and IoT are examined. Students gain hands-on experience developing blockchain solutions using Python and Hyperledger Fabric, including smart contracts and chain code. By the end, learners can design, implement, and evaluate blockchain-based systems for practical real-world applications.

Course Objectives:

1. To learn the fundamentals of Blockchain and various types of block chain and consensus mechanisms.
2. To understand the public block chain system, Private block chain system and consortium blockchain.
3. Able to know the security issues of blockchain technology.
4. Exploring cryptocurrency principles, Bitcoin, altcoins, tokens, and their usage in digital economy.
5. Applying knowledge of public, private, and consortium blockchains for real-world problem-solving.

Course Outcomes: After Completion of the Course, Students should be able to

1. Understand concepts behind crypto currency

2. Apply of smart contracts in decentralized application development
3. Explain public, private, and consortium blockchain architectures with relevant use cases.
4. Implement smart contracts and blockchain applications using Ethereum, Python, or Hyperledger Fabric.
5. Analyze blockchain security, privacy, scalability, and performance challenges across domains.

UNIT - I: Fundamentals of Blockchain: Introduction, Origin of Blockchain, Blockchain Solution, Components of Blockchain, Block in a Blockchain, The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol. Cryptocurrency – Bitcoin, Altcoin and Token: Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage. [10]

UNIT - II: Public Blockchain System: Introduction, Public Blockchain, Popular Public Blockchains, The Bitcoin Blockchain, Ethereum Blockchain.
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. [10]

UNIT - III: Private Blockchain System: Introduction, Key Characteristics of Private Blockchain, Need of 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, Need of Consortium Blockchain, Hyperledger Platform, Overview of Ripple, Overview of Corda. Initial Coin Offering: Introduction, Blockchain Fundraising Methods, Launching an ICO, Investing in an ICO, Pros and Cons of Initial Coin Offering, Successful Initial Coin Offerings, Evolution of ICO, ICO Platforms. [10]

UNIT - IV: Security in Blockchain: 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.
Applications of Blockchain: 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. [10]

UNIT - V: Blockchain Case Studies: Case Study 1 – Retail, Case Study 2 – Banking and Financial Services, Case Study 3 – Healthcare, Case Study 4 – Energy and Utilities.
Blockchain Platform using Python: Introduction, Learn How to Use Python Online Editor, Basic Programming Using Python, Python Packages for Blockchain.
Blockchain platform using Hyperledger Fabric: Introduction, Components of Hyper ledger Fabric Network, Chain codes from Developer.ibm.com, Blockchain Application Using Fabric Java SDK. [8]

TEXT BOOKS:

1. “Blockchain Technology”, Chandramouli Subramanian, Asha A. George, Abhilasj K A and Meena Karthikeyan, Universities Press.

REFERENCE BOOKS:

1. Michael Juntao Yuan, Building Blockchain Apps, Pearson, India.
2. Blockchain Blueprint for Economy, Melanie Swan, SPD O'reilly.
3. Blockchain for Business, Jai Singh Arun, Jerry Cuomo, Nitin Gaur, Pearson.

ELECTRONIC RESOURCES:

1. <https://www.blockchain-council.org/certifications/blockchain-101-course/>
2. <https://www.coursera.org/learn/blockchain-basics>
3. <https://www.coursera.org/learn/blockchain-fundamentals-smart-contracts>
4. <https://www.nubass.org/courses/blockchain-smart-contracts>
5. <https://alison.com/course/creating-an-ethereum-blockchain-using-solidity>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)