



Mehran University of Engineering and Technology, Jamshoro
Department of Software Engineering

ORIGINAL SUBMITTED SYLLABUS

Title of Subject	:	Blockchain Networks
Code	:	SE801
Discipline	:	Software Engineering
Effective	:	24PhDSE onwards
Pre-requisite	:	Database Systems, Programming Fundamentals
Assessment	:	10% Sessional 30% Mid Semester 60% Final Semester Examination
Credit Hours	:	3 + 0
Minimum Contact Hours:		Marks: 100

Objectives of course:

- Blockchain is leading to a paradigm shift in decentralized application programming. The aim of this course is to understand the foundational concepts of blockchain networks and to apply these concepts to design, program and deploy practical blockchain applications.

Course outline:

- **Chapter 1:**
Overview of Blockchain Technologies, Blockchain – Blocks and Nodes, Blockchain Working, Key Features of Block Chains, Blockchain Types – Permissionless (Public) and Permissioned (Enterprise), Blockchains versus Traditional Databases, Blockchain Use cases, Blockchain Applications, Blockchain Adoption Challenges.
- **Chapter 2:**
Blockchain Building Blocks, Cryptography, Hashing, Public-Private Key Pair, Cryptographic algorithms in Blockchain, Consensus, Blockchain Consensus Mechanisms, Challenges, Smart Contracts, Blockchain and Information Security.
- **Chapter 3:**
Applications of Blockchain for Supply Chains, Supply Chains – Architecture, Data Involved, Challenges, Blockchain – Immutability Working Principle, Privacy Handling in Permissioned Blockchain, Implementation Considerations & Steps.
- **Chapter 4:**
Blockchain Frameworks, Comparison of the Blockchain Frameworks, Decentralized Applications (DApps), Trending Decentralized Applications, Web 3.0, Digital Assets (Tokens), Cryptocurrencies, Ethereum, MetaMask Setup, Transaction, Block Time.
- **Chapter 5:**
Details on Smart Contracts (Theory), Latest Trends/Applications in Smart Contracts, Languages for Smart Contract Programming, Introduction to Solidity Programming, Programming Smart Contracts, Contract Structure, Function Declarations, Deploying Contracts, Testing with Remix, Smart Contracts Project Case Study.



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BOOKS RECOMMENDED

1. Vyas, Sonali, et al., eds. "Blockchain Technology: Exploring Opportunities, Challenges, and Applications.", Latest Edition.
2. Goksu, Bekir Bera. "Blockchain Basics: A Non-Technical Introduction in 25 Steps.", Latest Edition.
3. Bashir Imran. "Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more". Packt Publishing Ltd, Latest Edition.
4. Elrom Elad, "The blockchain developer", Apress, Latest Edition.
5. Vyas, Nick, Aljosja Beije, and Bhaskar Krishnamachari, "Blockchain and the supply chain: concepts, strategies and practical applications", Kogan Page Publishers, Latest Edition.

Approval:

Board of Studies:
Board of Faculty:
AS&RB
Academic Council:

Resolution No. 2.2
Resolution No. 21.10
Resolution No.
Resolution No.

Dated: 21-07-2023
Dated: 07-12-2023