School: ..... Campus: .....

Academic Year: ..... Subject Name: ..... Subject Code: .....

Semester: ..... Program: ..... Branch: ..... Specialization: .....

Date: .....

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiement : Blockchain in Supply Chains – Use Case Analysis

Objective/Aim:

To explore how blockchain technology can improve visibility, trust, and operational efficiency in supply chain systems. This includes examining real-world examples to understand how blockchain ensures transparency, data security, and smooth coordination among supply chain participants.

Apparatus/Software Used:

- **Blockchain Platform:** Ethereum / Hyperledger Fabric (conceptual use)
- **Development Tool**: Remix IDE (for smart contract design and testing)
- **Wallet:** MetaMask Wallet (for executing test transactions)
- **Local Network**:Ganache (for local blockchain setup)
- **Decentralized Storage**:IPFS (for storing product or shipment data)

Theory/Concept:

A **supply chain** is a network connecting producers, suppliers, distributors, and retailers to deliver products to customers. Traditional supply chains depend heavily on manual records and centralized systems, which often cause **data inconsistencies, limited transparency, and counterfeit issues**.**Blockchain technology** acts as a **distributed digital ledger** where all transactions are securely recorded and verified by multiple nodes. It allows every stakeholder to access a shared, tamper-proof record of product movement.

Key Benefits of Blockchain in Supply Chains:

1. **Transparency:** Every transaction is visible to authorized parties, ensuring trust across the network.
2. **Traceability:** The entire journey of a product — from production to delivery — can be tracked using unique blockchain entries.
3. **Immutability:** Once information is stored, it cannot be changed or deleted, preventing manipulation or fraud.
4. **Automation:** Smart contracts automatically execute conditions like payments or shipment confirmations without intermediaries.

Challenges in Traditional Supply Chains:

- **Limited Visibility:** Stakeholders often cannot track the product's origin or handling process.
- **Fake Products:** Counterfeit goods can infiltrate the system due to lack of traceability.
- **Paper-based Operations:** Manual record-keeping causes delays, errors, and lack of real-time data updates.

Procedure :

Procedure:

1. Identify all major supply chain participants such as **Manufacturer → Distributor → Retailer → Customer**.
2. Establish a **blockchain network** that connects all entities for recording each stage of product movement.
3. Develop and deploy a **smart contract** that defines product details and manages ownership transfers.
4. Update the blockchain after every transaction (e.g., shipment, delivery, or quality check).
5. Enable end users to **verify authenticity and source** of products by scanning a blockchain-generated record or code.

Observation table:

Stage	Participant	Transaction Description	Data Recorded on Blockchain
1	Farmer / Producer	Product creation or harvest	Product ID, timestamp
2	Distributor	Shipment and handling	Transfer record, location
3	Retailer	Product received	Verification and storage record
4	Consumer	Product purchased	Ownership and authenticity confirmation

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Interpretation Result and	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	**50**		

Signature of the Student:

Name :

Regn. No.

Signature of the Faculty: