

SNS COLLEGE OF ENGINEERING



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<u>19SB603- BASICS OF DISTRIBUTED</u> <u>LEDGER TECHNOLOGY</u>

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DISTRIBUTED LEDGER TECHNOLOGY

Distributed Ledger Technology (DLT) refers to a decentralized system for recording and managing transactions across multiple nodes or participants. Unlike traditional centralized databases, DLT ensures that all participants have a synchronized and tamper-resistant copy of the ledger.



Distributed Ledgers

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- **Decentralization** No single central authority controls the ledger; all nodes share equal responsibility.
- **Immutability** Once recorded, data cannot be altered or deleted, ensuring security.
- **Consensus Mechanism** Transactions are validated through protocols like Proof of Work (PoW) or Proof of Stake (PoS).
- **Transparency & Trust** All participants can verify transactions, enhancing trust.
- **Cryptographic Security** Data is encrypted and protected against unauthorized modifications.
- **Example:** Blockchain (used in Bitcoin and Ethereum) is a popular type of DLT.





Key Components



- Ledger: A digital record of transactions.
- Nodes: Independent computers maintaining the ledger.
- Consensus Mechanism: Protocols like
 PoW, PoS, or PBFT for transaction
 validation.
- **Cryptography:** Ensures security and data integrity.











- Blockchain (e.g., Bitcoin, Ethereum) Uses linked blocks for data storage.
- Directed Acyclic Graphs (DAGs) (e.g., IOTA) Uses a web-like structure for transactions.
- **Hashgraph** Consensus-driven DLT with fast transactions











• Finance

(Cryptocurrencies,

cross-border payments).

• Supply Chain (Tracking

product authenticity).

- Healthcare (Secure patient records).
- Voting Systems

(Tamper-proof elections).



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