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 : Security First – Understanding Blockchain

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

1. **Start the process of blockchain creation.**
2. **Initialize an empty blockchain to store blocks.**
3. **Create the first block, known as the *Genesis Block*, which acts as the foundation of the chain.**
4. **Assign it a unique index, input initial data, and set its previous hash value to zero since no block comes before it.**
5. **Generate the current hash of the Genesis Block using a cryptographic hash function (like SHA-256).**
6. **Add the Genesis Block to the blockchain.**
7. **For each new transaction or data entry:**
    - **Take the new data from the user.**
    - **Retrieve the hash value of the previous block.**
    - **Generate a new hash for the current block based on its data and the previous hash.**
    - **Add the new block to the blockchain sequence.**
8. **Display all blocks along with their details (index, data, previous hash, and current hash).**
9. **Verify the integrity of the blockchain by checking if each block's previous hash matches the hash of the preceding block.**
10. **Detect tampering — if any block's data is altered, the entire chain becomes invalid.**
11. **Stop the process after successful verification or detection of tampering.**

Software used:

1. VS Code.
2. MS Word.
3. Brave for researching.

*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error)

- The implementation phase involves executing the blockchain program to verify its correct functioning.
- During this phase, each block is successfully created and linked with the hash of the previous block, forming a secure chain.
- The output displays all the essential details of each block such as block number, data, previous hash, and current hash.
- The blockchain validation process confirms that all hashes match correctly, indicating no tampering in the chain.
- The final outcome shows that the blockchain system is valid, secure, and free from any errors, proving the effectiveness of its security mechanism.

* Observations:

- Blockchain's security mainly depends on consensus integrity and node honesty.
- Attacks often exploit network control, code loopholes, or human error.
- Implementing multi-layer verification and audited smart contracts reduces vulnerabilities.
- Proof of Stake and Proof of Authority systems offer better protection than traditional PoW in some cases.
- Continuous monitoring and security audits are essential to prevent evolving threats.

ASSESSMENT

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

Signature of the Student:

Name :

Regn. No. :

Signature of the Faculty:

**As applicable according to the experiment.*
Two sheets per experiment (10-20) to be used.

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Two sheets per experiment (10-20) to be used.