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 : **Smart Libraries – Libraries and Proxy Contracts**

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

ALGORITHM:

1.Start the Solidity environment (Remix IDE).
2.Create a library with reusable functions (e.g., mathematical operations or utility logic).
3.Import and link the library to a main contract for function reuse.
4.Implement a Proxy Contract pattern with two components:
Logic Contract – contains business logic.
Proxy Contract – forwards calls and maintains data storage.
5.Deploy both contracts and test upgrades by redeploying the logic contract while keeping the proxy address same.
6.Verify the functionality and storage persistence.
7.End.

* Softwares used

- Brave browser
  Talentica.com
  https://www.talentica.com/blogs/implementing-upgradeable-smart-contracts-using-proxy-patterns/

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

* Implementation Phase: Final Output (no error)

• **Comprehensive Smart Contract Testing:**
Conducted in-depth validation of smart contracts to detect potential issues such as reentrancy, integer overflow, and unauthorized access using both manual and automated testing methods.

• **Code Integrity & Security Assurance:**
Ensured robust contract performance by verifying logical flow, transaction safety, and data accuracy before deployment to prevent vulnerabilities.

• **Standardized QA Framework:**
Implemented Ethereum-based testing standards using tools like **Slither**, **Mythril**, and **Remix**, maintaining consistency and transparency across all quality checks.

• **Scalable Testing Environment:**
Developed a flexible and reusable testing setup allowing re-validation, modular testing, and continuous improvement for long-term reliability and learning.

* Observations

1.Smart Libraries in Solidity reduce repetitive code and improve efficiency.

2.Proxy Contracts provide a way to upgrade smart contracts without changing their address.

3.Combining Libraries and Proxies creates scalable, maintainable, and modular smart contracts.

4.Using Hardhat simplifies compiling, testing, and deployment processes.

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.*