



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 Experiment : Decentralized Identity – DID and Credential Demo

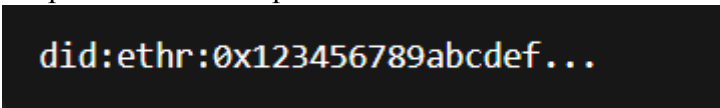
Objective/Aim:

To understand the concept of **Decentralized Identifiers (DIDs)** and **Verifiable Credentials (VCs)** by performing a demo that showcases how blockchain can be used to create, issue, and verify secure digital identities without centralized authorities.

Apparatus/Software Used:

- MetaMask Wallet
- Node.js and npm
- Visual Studio Code (VS Code)
- DID and VC Tools:
- **SpruceID Playground** (<https://playground.spruceid.dev/>)
- **Veramo Framework** (<https://veramo.io/>)
- **W3C DID Resolver**
- Blockchain Test Network (Ethereum / Polygon Testnet)

Theory/Concept:

- **Decentralized Identity (DID)** is a blockchain-based identity management system that gives individuals full control over their digital identity without relying on centralized authorities like governments or corporations.
- **Key Concepts:**
- **DID (Decentralized Identifier):**
A globally unique identifier that resolves to DID Documents containing public keys and service endpoints. Example:

- **DID Document:**
Contains verification keys and authentication methods for the holder's identity.
- **Verifiable Credentials (VCs):**
Digitally signed credentials (like certificates, licenses, or ID proofs) that can be verified cryptographically without revealing private data.

Procedure

Setup Environment:

- Install Node.js and VS Code.
- Connect MetaMask to a test network (e.g., Polygon Mumbai or Ethereum Sepolia).

Open SpruceID Playground

- Go to <https://playground.spruceid.dev/>.
- Select the **DID & VC Demo** option.
- **Generate a DID:**
- Choose “Create a DID” (using did:key or did:ethr method).
- Copy your generated DID and note its structure.
- **Create Verifiable Credential (VC):**
- Select the “Issue VC” option.
- Fill credential details (name, issuer DID, subject DID, claim details like “Student of XYZ College”).
- Generate and sign the credential.
- **Verify the Credential:**
- Paste the generated VC into the **Verification Tool** within SpruceID Playground.
- Observe the verification process — the cryptographic proof validates authenticity and issuer identity.
- **Use Veramo Framework (Optional):**
- Install Veramo CLI:

```
npm install -g @veramo/cli
```

- ☐

Create an agent, generate DIDs, and issue/verify credentials via CLI.

Record Details:

- Note the DID format, credential signature, and verification output.

Observation Table:

Successfully created a DID (did:ethr:...) using SpruceID Playground.
 Issued a verifiable credential linking an identity claim (e.g., student certificate).
 Credential verified successfully using cryptographic proof.
 The process required no centralized authority — only blockchain-based trust.

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 Faculty:

Signature of the Student: