EtherAuthority

1-Month Internship Program

Web3 • Blockchain • React.js • Node.js • Artificial Intelligence

Academic Year: 2025 – 2026

Program Overview

EtherAuthority is pleased to introduce a structured 1-month internship program designed to provide hands-on industry exposure across Web3, Blockchain, Full-Stack Development, and Artificial Intelligence. This program focuses on real-world project development, testnet deployments, and professional best practices.

Duration: 4 Weeks
Outcome: Practical skills, mini-projects, and final deployment
Focus Areas: Web3, Blockchain, React.js, Node.js, Artificial Intelligence

Program Overview

This document outlines the complete and detailed curriculum for the EtherAuthority Free Internship Program for the academic year 2025–2026. The program focuses on industry-ready skills through structured learning, hands-on tasks, and real-world project exposure in Artificial Intelligence, Blockchain/Web3, React.js, and Node.js.

Course & Program Syllabus:

1. Artificial Intelligence (AI)

1.1 Core AI Fundamentals

- What is Artificial Intelligence
- History and evolution of AI
- AI vs ML vs Deep Learning
- Real-world applications of AI

1.2 AI Tools & Usage

Coding Assistants:
- ChatGPT (Free tier)
- GitHub Copilot
- Codeium
- Tabnine
- Replit Ghostwriter

Architecture & Reasoning Tools:
- ChatGPT (GPT-5 models)
- Claude 3.5
- DeepSeek R1

DevOps & Automation:
- Copilot Workspace
- ChatGPT for scripting & automation

1.3 Learning Resources

https://www.qodo.ai/blog/best-ai-coding-assistant-tools/

2. Blockchain & Web3 Development

2.1 Blockchain Fundamentals

- What is Blockchain
- Distributed ledger concepts
- Blocks, transactions, and hashes and nodes
- Cryptographic hash functions (SHA-256, Keccak)
- Public key cryptography
- Merkle Trees
- Immutability & transparency
- Consensus mechanisms
- Public, Private & Consortium blockchains
- Blockchain vs traditional databases

2.2 Ethereum & Web3 Basics

- Ethereum ecosystem
- Ethereum Virtual Machine (EVM)
- Gas, gas fees & transactions
- Wallets Learn:

    - MetaMask
    - Trust Wallet
    - TokenPocket

- OKX Wallet
- Coinbase Wallet
- coinmask

- EOA vs Contract accounts
- Nonce, calldata & transaction hash
- RPC providers (Alchemy, Infura, QuickNode)

2.3 Solidity Programming

- Solidity syntax & structure
- Data types
- Storage vs Memory vs Calldata
- Functions (pure, view, payable)
- Events & error handling
- Modifiers, structs, mappings & enums
- ABI, interfaces & libraries
- Reentrancy & security basics(Security & Attacks learn)

2.4 Smart Contract Standards & Projects

- ERC20 Tokens
- ERC721 NFTs
- Staking & Farming contracts
- Multisig wallets
- Crowdfunding & Lottery contracts
- Oracle integration

2.5 Development Tools

- Remix IDE
- Hardhat
- Foundry
- Truffle & Ganache
- Testing & debugging tools

2.6 Consensus Mechanisms (Very Important)

- Proof of Work (PoW)
- Proof of Stake (PoS)
- Delegated Proof of Stake (DPoS)
- Proof of Authority (PoA)
- Byzantine Fault Tolerance (PBFT, IBFT)
- Leader election
- Finality (probabilistic vs instant)

2.8 Networking & P2P Layer

- Peer discovery
- Node communication
- Gossip protocols
- Syncing blocks & state
- Handling forks
- Node roles: Full node, Validator, Light node
- RPC / WebSocket APIs

2.9 Learning Resources

- https://solidity-by-example.org/

- https://www.tutorialspoint.com/solidity/index.html

- https://www.geeksforgeeks.org/solidity/solidity/

- https://www.dappuniversity.com/articles/solidity-tutorial

- https://www.youtube.com/watch?v=EhPeHeoKF88

- https://www.youtube.com/watch?v=aGonv5DP910

- Web3 Tutorial: Intro for Beginners
  - https://www.youtube.com/watch?v=2TV0r94p8OY
- Web3 Fundamentals Explained
  - https://www.youtube.com/watch?v=xMicygVbMik
- Blockchain Developer Roadmap (Hindi/English)
  - https://www.youtube.com/watch?v=ixXDUqQtHtk
- Solidity + Web3 Full Course:
  - https://youtu.be/gyMwXuJrbJQ
- Blockchain Basics Crash Course
  - https://youtu.be/qOVAbKKSH10
- Build a DApp From Scratch
  - https://youtu.be/aqxAWLi6UMA
- Ethereum & Smart Contracts Tutorial
  - https://youtu.be/3g2WT2jmsNk
- LearnWeb3 DAO (Beginner → Advanced)
  - https://learnweb3.io/
- Alchemy University (100% FREE)
  - https://university.alchemy.com
- Moralis Web3 Tutorials
  - https://moralis.io/learn/
- FreeCodeCamp Blockchain Path
  - https://www.freecodecamp.org/learn

3. React.js

3.1 Core React Concepts

- JSX
- Components
- Props & State
- Hooks (useState, useEffect, useContext)
- Conditional rendering

3.2 State Management & Routing

- Context API
- Redux Toolkit
- Zustand
- React Router DOM

3.3 Advanced React

- Custom hooks
- Performance optimization
- Lazy loading & Suspense
- Error boundaries

3.4 UI & API Integration

- REST API integration
- Fetch & Axios
- Tailwind CSS
- Material UI
- Shadcn UI

3.5 Learning Resources

- https://www.geeksforgeeks.org/reactjs/react/

- https://www.w3schools.com/REACT/DEFAULT.ASP

- https://www.youtube.com/watch?v=RVFAyFWO4go

- https://www.youtube.com/watch?v=CgkZ7MvWUAA

    - React Full Course 2024
        - https://youtu.be/SqcY0GlETPk
    - React Crash Course (Traversy Media)
        - https://youtu.be/w7ejDZ8SWv8
    - React Hooks Explained
        - https://youtu.be/TNhaISOUy6Q
    - React + Vite Setup Crash Course
        - https://youtu.be/2OTqPjZCXk0

4. Node.js & Backend Development

4.1 Node.js Fundamentals

- Event loop
- Modules
- NPM & package.json

4.2 Backend Architecture

- Express.js
- Routing & middleware
- MVC architecture
- Error handling

4.3 APIs & Authentication

- REST APIs
- CRUD operations
- JWT Authentication
- OAuth basics

4.4 Databases & Deployment

- MongoDB & Mongoose
- PostgreSQL
- Prisma ORM
- Docker
- Supabase
- Cloud deployment (AWS, Render, Railway)

4.5 Learning Resources

- https://www.w3schools.com/nodejs/

- https://nodejs.org/en/learn/getting-started/introduction-to-nodejs

- https://www.geeksforgeeks.org/node-js/nodejs/

- Node.js Full Course (freeCodeCamp)
    - https://youtu.be/Oe421EPjeBE
- Express.js Crash Course (Traversy)
    - https://youtu.be/gnsO8-xJ8rs
- Node.js API + MongoDB
    - https://youtu.be/UMQ2PfjhGzs
- JWT Auth System with Node.js
    - https://youtu.be/7nafaH9SddU

5. Web3 + React + Node.js Combined Tutorials:

- Build a Full Stack DApp (React + Solidity + Hardhat)
    - https://youtu.be/umepbfKp5rI
- Web3 Login with (MetaMask, Trust Wallet, TokenPocket, OKX Wallet, Coinbase Wallet,coinmask) + React
    - https://youtu.be/aLgF9msRses
- NFT Marketplace (React + Solidity)
    - https://youtu.be/Gf4bLpfz0Yg
- DAO App (Solidity + React)
    - https://youtu.be/s8H0YIhP6r8

6. Learning Modules & Weekly Breakdown:

Week 1 – Foundations (Web3 + React Basics + AI Basics)

Topics:

- Blockchain fundamentals & Ethereum basics
- Solidity syntax and smart contract deployment
- React.js fundamentals (components, props, state)
- AI fundamentals and real-world use cases
- Set up Hardhat, Foundry (optional), Ganache/Anvil.

Tasks:

- Development environment setup
    - Install Node.js, npm/yarn, VS Code, and (MetaMask, Trust Wallet, coinmask, TokenPocket, OKX Wallet, Coinbase Wallet).
- Deploy smart contract on Sepolia and remix IDE
    - HelloWorld contract
    - Counter contract
    - Simple Storage
    - Ownable pattern
    - Ether Transfer Smart Contract
    - Ethereum Account & Ownership Example
    - Student Registration Contract
    - Simple Voting Contract
    - Store & update internship task status
- Build a basic React application
    - Example:
        - Counter App
        - Input Form App
        - Todo List App
        - Simple API Fetch Example
        - Component Reuse Example
- AI concept documentation

Deliverables:

- Sepolia contract address
- React GitHub repository with examples

Week 2 – Tokens, NFTs & Backend Development

Topics:

- ERC20 & ERC721 smart contracts
- IPFS & decentralized storage
- Node.js & Express backend
- MongoDB database integration
- Token Economics (Tokenomics)
    - Total supply
    - Minting & burning
    - Reward distribution
    - Vesting schedules
    - Treasury & reward pools
    - Fee redistribution
    - Anti-inflation mechanisms

Tasks:

- Deploy ERC20,ERC721 token
    - Examples:
        - ERC20 Smart Contract(minimum 2)
            - Intern Reward Token
            - Task Completion Token
            - Attendance Token
        - ERC721 Smart Contract (NFT)(minimum 2)
            - Internship Certificate NFT
            - Course Completion NFT
            - Achievement Badge NFT
- Create NFT minting contract
- Build REST APIs
    - Node.js & Express Backend(minimum 2)
        - Intern Registration API
        - Task Submission API
        - Token Minting API
    - MongoDB Integration(minimum 2)
        - Intern Profile Database
        - Task Tracking Database
        - NFT Record Database
- Connect React frontend to backend
    - Example:(minimum 1)
        - Internship Reward DApp
        - NFT Certificate Issuer DApp
        - Intern Management Web3 App

Week 3 – DeFi, Security & Full-Stack Integration

Topics:

- DeFi concepts & staking mechanisms

- Chainlink price feeds
- Smart contract security best practices
- JWT authentication & authorization
- Machine learning fundamentals

Task:

- Develop a staking smart contract
- Integrate frontend, backend & blockchain
- Security issue analysis
- ML mini-experiment

Deliverables:

- Staking DApp
- Security report

Week 4 – Final Project & Deployment

Topics:

- Gas optimization & contract verification
- Full-stack deployment
- Documentation & demo preparation
- AI mini project implementation

Task:

- Final project development
- Deploy frontend & backend
- Prepare documentation & demo video

Deliverables:

- Live project links
- Final presentation & demo

Final Project Options

• NFT Marketplace
• DeFi Staking Platform
• Token Vesting System
• Mini Decentralized Exchange (DEX)
• DAO Governance Platform

Certification

Participants who complete the internship program and final evaluation will be awarded an official Internship Completion Certificate from EtherAuthority.