Course Title	Building Web 3.0 Applications with Solidity Language
Course Length	30 Hours (15 lectures x 2 hours per lecture)
Target Audience	The course is designed for technical audiences, including (but not limited to): • Web developers • Programmers • Technopreneurs • Students or recent graduates in CS, IT or Engineering majors • Anyone interested in blockchain technology and Web 3.0 development
Language of Instruction	Urdu, English

Course Description
This course will take you from a beginner to an expert in Solidity, the most popular language for developing smart contracts in the Ethereum ecosystem. You'll learn about Solidity basics, contract design patterns, security considerations, and deployment. You'll also explore applications commonly developed and deployed using Solidity, including NFTs, DeFi, Cryptocurrency, dApps, DAOs, Bridges, and Games. With practical examples and hands-on exercises, Truscova aims to help you confidently develop your decentralised applications using Solidity.

Course Learning Outcomes	
	By the end of this course, the students should be able to:
LO1:	Successfully build decentralised applications using Solidity programming language.
LO2:	Deep understanding of blockchain technology and the Ethereum ecosystem
LO3:	Confidently develop applications such as NFTs, DeFi, Cryptocurrencies, DAOs, Bridges.
LO4:	Smart contracts design patterns and security considerations

LO5:	Testing and verification of smart contracts
LO6:	Deployment of smart contracts on testnet and mainnet.

Assessments/Graded Components
• 80% attendance • Mini-projects

Course Summary

Lecture	**Module Name**	**Key Concepts/Topics Covered**	**Assessments**
1	Introduction to Blockchain and Ethereum	• Overview of Blockchain Technology • Introduction to Ethereum • Ethereum Ecosystem	
2	Solidify Your Basics: Introduction to Solidity Language	• Basics of Solidity Language • Writing a Simple Smart Contract • Solidity Development Tools	
3	Solidify Your Control: Data Types and Control Structures in Solidity	• Solidity Data Types • Control Structures in Solidity • Error Handling	
4	Solidify Your	• Contract Design Patterns	

	Skills: Advanced Solidity Concepts	• Inheritance and Polymorphism • Time-Related Functions	
5	Solidify Your Security: Solidity Security Considerations – Part I	• Common Smart Contract Vulnerabilities • Best Practices for Secure Contract Development	
6	Solidify Your Security: Solidity Security Considerations – Part II	• Common Smart Contract Vulnerabilities • Best Practices for Secure Contract Development • Contract Auditing Tools	
7	Solidify Your NFTs: Developing NFTs with Solidity	• Non-Fungible Tokens (NFTs) • Solidity Libraries for NFT Development	
8	Solidify Your DeFi: Developing DeFi Applications with Solidity	• Decentralized Finance (DeFi) Applications • Solidity Libraries for DeFi Development	
9	Solidify Your Cryptocurrency: Developing	• Cryptocurrency Development • Solidity Tools and Frameworks for Cryptocurrency Development	

	Cryptocurrencies with Solidity		
10	Solidify Your dApps: Developing dApps with Solidity	• Decentralised Applications (dApps) • Solidity Tools and Frameworks for dApp Development	
11	Solidify Your DAOs: Developing DAOs with Solidity	• Decentralised Autonomous Organizations (DAOs) • Solidity Tools and Frameworks for DAO Development	
12	Solidify Your Bridges and Games: Developing Bridges and Games with Solidity	• Bridges between different Blockchains • Game Development using Solidity • Solidity Tools and Frameworks for Bridge and Game Development	
13	Solidify Your Testing: Testing Solidity Code	• Testing Solidity Contracts • Truffle Suite	
14	Solidify Your Debugging: Debugging Solidity Code	• Debugging Techniques and Tools • Understanding and Managing Errors	
15	Solidify Your Deployment: Deploying	• Deployment Process • Gas and Transaction Costs • Deployment on the Mainnet	

	Solidity Smart Contracts		

Supplementary Reading Material
• Ethereum: A Next-Generation Smart Contract and Decentralised Application Platform. By Vitalik Buterin (2014). • Bitcoin: A Peer-to-Peer Electronic Cash System • Ethereum for Architects and Developers • Mastering Ethereum: Building Smart Contracts and Dapps • Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more, 3rd Edition • Blockchain Basics - A Non-Technical Introduction in 25 Steps • Building Ethereum DApps: Decentralized Applications on the Ethereum Blockchain • Solidity Programming Essentials: A beginner's guide to build smart contracts for Ethereum and blockchain • Hands-On Smart Contract Development with Solidity and Ethereum • https://docs.soliditylang.org/en/v0.8.20/ • https://ethereum.org/en/what-is-ethereum/