Blockchain Security
BC-106

Duration: 3 days; Instructor-led
Time: 9:00 AM – 5:00 PM

ABOUT THIS COURSE

This dynamic Blockchain Security course covers all known aspects of Blockchain security that exist in the Blockchain environment today. This course provides a detailed overview of all Blockchain security issues, including threats, risk mitigation, node security integrity, confidentiality, best security practices, advanced Blockchain security and more. The in-depth lab sessions will provide the student with practical, real-world tools for not only recognizing security threats, but mitigation and prevention as well.

OBJECTIVES

In this course, participants will learn about:
- Identifying and differentiating between security threats and attacks on a Blockchain network
- Blockchain security methods, best practices, risk mitigation, and more
- All known (to date) cyber-attack vectors on the Blockchain
- Performing Blockchain network security risk analysis
- A complete understanding of Blockchain's inherent security features and risks
- An excellent knowledge of best security practices for Blockchain System/Network Administrators
- Demonstrating appropriate Blockchain data safeguarding techniques

Participants who attend this course will be able to demonstrate their ability to:
- Discuss fundamental Blockchain security
- Describe consensus in a Blockchain
- Understand and describe the various Blockchain security mechanisms
- Understand and describe what smart contract security entails
- Perform Blockchain risk assessments
- Securely implement business Blockchains
- Mitigate Network and System level vulnerabilities and attacks

PREREQUISITES

No prerequisites.

AUDIENCE

Due to the in-depth focus on technical cyber-security methods, and the broad scope of this course, those with current cyber-security knowledge, Blockchain architecture, and/or experienced programmers will benefit the most from this course, including:

Target audience includes:
- Blockchain Architects
- Blockchain Developers
- Application Developers
- Blockchain System Administrators
- Network Security Architects
- Cyber Security Experts
- IT Professionals w/cyber security experience

COURSE CONTENTS

Module 1: Fundamental Blockchain Security
- Cryptography for the Blockchain
- A Brief Introduction to Blockchain
- Blockchain Security Assumptions
- Limitations of Basic Blockchain Security

Module 2: Consensus in the Blockchain
- Blockchain Consensus and Byzantine Generals
- Introduction to Blockchain Consensus Security
- Proof of Work
- Proof of Stake
- Other Blockchain Consensus Algorithms

Module 3: Advanced Blockchain Security Mechanisms
- Architectural Security Measures
- Permissioned Blockchains
- Checkpointing
- Advanced Cryptographic Solutions
- Multiparty Signatures
- Zero-Knowledge Proofs
- Stealth Addresses
- Ring Signatures
- Confidential Transactions

Module 4: Smart Contract Security
- Introduction to Smart Contracts
- Smart Contract Security Considerations
- Smart Contract Code Auditing

Module 5: Blockchain Risk Assessment
- Blockchain Risk Considerations
- Regulatory Requirements
- Blockchain Architectural Design

Module 6: Basic Blockchain Security
- User Security
- Node Security
- Network Security

Module 7: Blockchain for Business
- Introduction to Ethereum Security
- Introduction to Hyperledger Security
- Introduction to Corda Security

Module 8:   Securely Implementing Business Blockchains

- Business Operations
- Data Management
- Infrastructure
- Legal and Regulatory Compliance

Module 9:   Network-Level Vulnerabilities and Attacks

- 51% Attacks
- Denial of Service Attacks
- Eclipse Attacks
- Replay Attacks
- Routing Attacks
- Sybil Attacks

Module 10: System-Level Vulnerabilities and Attacks

- The Bitcoin Hack
- The Verge Hack
- The EOS Vulnerability
- The Lisk Vulnerability

Module 11: Smart Contract Vulnerabilities and Attacks

- Re-entrancy
- Access Control
- Arithmetic
- Unchecked Return Values
- Denial of Service
- Bad Randomness
- Race Conditions
- Timestamp Dependence
- Short Addresses

Module 12: Security of Alternative DLT Architectures

- Introduction to DAG-Based DLTs
- Advantages of DAG-Based DLTs
- Limitations of DAG-Based DLTs