BOARD INFINITY

COURSE 3 OF 3 · BLOCKCHAIN TECHNOLOGY APPLIED SPECIALIZATION

Deep Dive into Cryptography

Full course syllabus - every module, video lesson, reading and assignment, from encryption and hashing to zero-knowledge proofs and quantum readiness.

Board Infinity
Instructor · Offered on Coursera

3	27	12	1 week
Modules	Video lessons	Assignments	At 10 hours a week

INSIDE THE COURSE

01	Cryptography Basics in Blockchain	4 hours to complete
02	Advanced Cryptography Concepts	4 hours to complete
03	Cryptography in Practice	4 hours to complete

Enroll on Coursera

https://www.coursera.org/learn/deep-dive-into-cryptography

01 ABOUT THE COURSE

A deep dive into blockchain cryptography.

Deep Dive into Cryptography is a comprehensive journey through the essential and advanced cryptographic techniques that underpin blockchain technology, blending theory with practical application.

It focuses on critical areas such as zero-knowledge proofs, homomorphic encryption and consensus algorithms - 27 videos, 9 readings and 12 assignments in all - for beginners and seasoned professionals alike.

WHO IT'S FOR

Blockchain developers
Understanding the cryptography beneath what they build.

Security professionals
Extending their skills to on-chain security and consensus.

Computer science students
Following a structured path from basics to advanced methods.

Web3 architects
Evaluating protocols to design secure, efficient systems.

WHAT YOU'LL LEARN

01 **Master the building blocks** Module 1
Illustrate the fundamental principles and techniques of cryptography in blockchain

02 **Choose a consensus algorithm** Module 1
Compare Proof of Work, Proof of Stake and other mechanisms, and choose the right one

03 **Apply advanced privacy techniques** Module 2
Apply advanced cryptographic methods to enhance data security and privacy

04 **Secure real blockchain systems** Module 3
Evaluate cryptographic protocols and algorithms to optimize blockchain performance

02 SYLLABUS

Three modules, basics to practice.

1 week to complete at 10 hours a week. Flexible schedule - learn at your own pace.

01 Cryptography Basics in Blockchain

4 hours

Encryption and hashing, public key cryptography, and consensus

9 videos

BY THE END OF THIS MODULE YOU CAN

- Compare symmetric and asymmetric encryption, and use hash functions
- Explain public key infrastructure and digital signatures
- Apply key management and security practices
- Compare PoW, PoS and other consensus mechanisms

CONTENTS: 9 videos (61 min) · 3 readings (90 min) · 4 assignments (105 min) · 1 plugin (5 min)

TOPICS: Understanding Cryptography · Public Key Cryptography and Blockchain · Consensus Algorithms · Quick Course Check-In (plugin)

You'll leave with: a solid grounding in the cryptographic building blocks and consensus algorithms every blockchain relies on.

02 Advanced Cryptography Concepts

4 hours

Zero-knowledge proofs, homomorphic encryption, and protocols

9 videos

BY THE END OF THIS MODULE YOU CAN

- Explain, apply and implement zero-knowledge proofs
- Describe homomorphic encryption, its use cases and challenges
- Explain multiparty computation and secure messaging
- Analyze cryptographic protocols in blockchain

CONTENTS: 9 videos (61 min) · 3 readings (90 min) · 4 assignments (105 min)

TOPICS: Zero-Knowledge Proofs (ZKP) · Homomorphic Encryption · Cryptographic Protocols in Blockchain

You'll leave with: a working understanding of the advanced techniques that add privacy and security to blockchain systems.

03

Cryptography in Practice

Practical security, privacy enhancements, and the future of cryptography

4 hours

9 videos

BY THE END OF THIS MODULE YOU CAN

- Implement encryption techniques and secure data on blockchain
- Analyze real-world use cases and examples
- Explain mixing services, privacy coins and their regulatory implications
- Assess quantum computing and future trends in cryptographic algorithms

CONTENTS 9 videos (64 min) · 3 readings (90 min) · 4 assignments (105 min)

TOPICS Practical Blockchain Security | Privacy Enhancements in Blockchain | Future of Cryptography in Blockchain

You'll leave with: the practical judgment to secure blockchain data today, and to prepare for what quantum computing brings.

03 TOOLS & SKILLS

The techniques that run through the course.

Hashing & signatures — Module 1

Hash functions, PKI and digital signatures behind every transaction.

In this course: Plus key management and security.

Consensus algorithms — Module 1

Proof of Work, Proof of Stake and other mechanisms.

In this course: How to choose the right algorithm for a project.

Zero-knowledge proofs — Module 2

Proving something is true without revealing the data.

In this course: Applications and implementation in blockchain.

Homomorphic encryption & MPC — Module 2

Computing on encrypted data without exposing inputs.

In this course: Use cases, practical challenges and solutions.

SKILLS YOU LEAVE WITH

Fundamentals

- Symmetric & asymmetric encryption
- Hash functions
- Digital signatures & PKI
- Key management

Advanced techniques

- Zero-knowledge proofs
- Homomorphic encryption
- Multiparty computation
- Protocol analysis

Applied security

- Securing blockchain data
- Consensus selection
- Privacy & regulation
- Quantum-era readiness

04 CERTIFICATE & CAREER

Finish with a shareable certificate.

Add it to LinkedIn
Add this credential to your LinkedIn profile, resume, or CV.

Share it anywhere
Share it on social media and in your performance review.

Earned, not attended
Awarded on completion of the graded quizzes in all three modules.

Course 3 of 3
The final course of the Blockchain Technology Applied Specialization.

WHERE THESE SKILLS ARE IN DEMAND

Blockchain Security Engineer · Cryptography Engineer · Privacy Engineer · Smart Contract Auditor · Blockchain Architect · Security Analyst

Board Infinity
Instructor · Offered on Coursera

Intermediate level · Taught in English · 7 languages available · Flexible schedule

Ready to master blockchain cryptography?

Enrollment, lessons, grading and the certificate all happen on Coursera.

Enroll on Coursera

Course page: coursera.org/learn/deep-dive-into-cryptography

Want a coach alongside the course?

Board Infinity 1:1 coaching is a separate, optional Board Infinity offering - it is not part of the Coursera course. Details: https://www.boardinfinity.com/career-coaching/

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