Blockchain: Understanding Its Uses and Implications (LFS170x)

Course Overview

Blockchain technology is changing how businesses operate. With trust built into blockchain solutions, it is important to understand how this new technology is different and how it works in comparison with technologies of the past.

The first segment of this course covers the main concepts of what blockchain is and some of the major characteristics that make this transformative technology so important. It takes you through the important players in this diverse community. It discusses how it began, first introduced for the administration of the Bitcoin cryptocurrency, and how it is now applied to all aspects of business including, government, banking, supply chains, and a host of other industries.

The next section analyzes some of the mechanics of blockchains and how they work. We will cover the concept of transparent ledgers, both public and permissioned, and focus on using cryptography to achieve consensus, immutability, and transparency. This is all part of blockchain's ability to provide "trusted data from untrusted sources", disrupting traditional accounting methodologies and international trade.

The course will then cover some of the functions of blockchain. You will discover the power of the smart contract, the building blocks for transactions on the blockchain. You will gain an understanding of the different blockchain structures and how start up decisions influence how your blockchain deals with security, identity, consensus, and governance.

The course then dives into the various methods of blockchain governance that currently exist in the community. You will understand how different governance models dictate how your

blockchain operates. You will also gain insight into consortiums and how this transformative technology is creating new avenues of communication.

The next section of the course includes examining problems blockchain solves that have been difficult to overcome in the past with more centralized architectures. You will discover how blockchain tackles the double spend issue, creates autonomy and transparency while facilitating innovative ways for multiple parties to interact. You will then discover the new and creative ways blockchain is changing the future. New insights and models dealing with how we identify ourselves on the Internet and how we can trust creditantial with blockchain-based solutions will be explored. You will look at trends in Decentralized Finance, NFT (non-fungible tokens), CBDC (central bank digital currencies) and how the push for interoperability between blockchains is becoming increasingly important.

The final part of the course takes a deep dive into the various use cases of blockchain, complete with analyzing real examples of how different industries are executing the technology and opening up new avenues for improving their businesses.

Course Learning Objectives

By the end of this course, you should be able to:

- Discuss blockchain technologies.
- Understand why Blockchain is a transformative technology with potential for change around the world.
- Understand how blockchain is solving problems that were difficult in the past.
- Discuss blockchain use cases in production today.

Prerequisites

No previous experience required for this course.

Audience

This course is for both business and technical staff who need to understand how blockchain technology is changing how we transact.

Course Instructors

Bobbi Muscara is currently a member of the *Hyperledger Technical Steering Committee* and the Chairperson of the *Hyperledger Learning Materials Development Working Group* where she is responsible for moderating the biweekly meetings, setting agendas, maintaining the Confluence wiki page and developing the documentation standards for Hyperledger Projects and Special Interest Groups.

She also helped develop the *Giving Chain* project, a blockchain initiative to reallocate wealth with a decentralized charity giving application (R2D) recipient to donor. The Giving Chain Project successfully collected and distributed 100 plus “Giving Bags” of food to local food insecure individuals and area food banks. The project won recognition at the government Blockchain Association 2020 award program. The Giving Chain is a sponsored Hyperledger Mentorship Summer 2021 project.

Bobbi opened *Ledger Academy*, a blockchain training Center at Tiger Labs in Princeton, NJ, specializing in custom training programs and consulting. She is the organizer for the Hyperledger Princeton Meetup, Princeton Blockchain Meetup and Ledger Academy’s Blockchain Fundamentals Meetup which combined has over 1500 members. Ledger Academy has developed courseware for edX and The Linux Foundation.

Bobbi holds two undergraduate degrees, BS in Computer and Decision Science, and BS in Management and Organizational Behaviors. In 2002 she received a Master’s in Business Education. She holds a NJ Teaching Certification in Business and is a winner of The Government Blockchain Association 2020 Blockchain award for Social Impact.

Rosa Santos is the Director of Education at Blockchain Training Alliance. She serves as a primary resource on all Blockchain training and education for the company. Rosa manages and integrates the educational team’s efforts to provide high quality education standards. This is

essentially done by implementing, developing and maintaining the full cycle of all training and education materials and learning platforms. Rosa also has a 10-year background in Journalism.

Kris Bennett is a Senior Instructor at Blockchain Training Alliance. He has delivered Blockchain training worldwide, bringing this emerging technology to different markets. Kris has developed high quality course content ensuring the instructional material is comprehensive and relatable to real-world solutions. His skills include developing an Architecture training course and contributing his expertise to a certification exam. Kris also has a 20-year background in custom software design, delivery, and consulting.

Ernesto Lee is CTO of Blockchain Training Alliance. He has extensive knowledge in developing content and providing training in Blockchain. His skills include building Hyperledger Chaincode for developer courses and building Solidity-based Smart Contracts for Ethereum networks. Ernesto also has 20 years of extensive experience with various aspects of computer programming, analysis, development, implementation, testing, maintenance, and support. Extensive experience with client/server architectures, data communication, GUI applications design and development in Java on WebLogic Server, WebCenter Portal, Apache Spark, Apache Hive and Apache HBase.

Course Length

15-20 hours

Course Outline

Welcome!

- Welcome!

Chapter 1. Introduction to Blockchain

- Introduction
- Introduction to Blockchain and The Early Internet
- Basis of Blockchain
- Career Opportunities in Blockchain
- Blockchain Use Cases
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 2. Blockchain Mechanics

- Introduction
- Understanding Ledgers
- Cryptography
- Transparency and Immutability
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 3. Blockchain Functions

- Introduction
- Smart Contracts
- Blockchain Security
- Public and Permissioned Blockchains
- The Blockchain Transaction
- Consensus
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 4. Blockchains and Governance

- Introduction
- Open Source Code
- Governance
- Identity and Anonymity on Blockchain
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 5. Blockchain Problem Solving and Future Trends

- Introduction
- Problems Blockchain Solves
- Digital Currencies

- Future Trends
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 6. Blockchain Use Cases

- Introduction
- Blockchain in Practice
- Enterprise Solutions
- Public Sector Solutions
- Social Impact Solutions
- Platform Developer's Solutions
- End User Solutions
- Future of Blockchain
- Knowledge Check (Verified Certificate track only)
- Summary

Final Exam (Verified Certificate track only)

edX Platform

If you are using edX for the first time, we strongly encourage you to start by taking a free 'how to use edX' course that the team at edX has made available. In this course, you will learn how to navigate the edX platform, how to connect with other edX learners, how to answer problems on the edX platform, how grades work in edX courses, and how to complete your first course.

Click here to register for "*DemoX*" and you will be on your way. You will find the edX platform simple and intuitive.

Getting Help

For any **technical issues** with the edX platform (including login problems and issues with the Verified Certificate), please use the **Help** icon located on the upper right side of your screen.

One great way to interact with peers taking this course and resolving any **content-related issues** is via the **Discussion Forums**. These forums can be used in the following ways:

- To discuss concepts, tools, and technologies presented in this course, or related to the topics discussed in the course material.
- To ask questions about course content.
- To share resources and ideas related to blockchain.

We strongly encourage you not only to ask questions, but to share with your peers opinions about the course content, as well as valuable related resources. The Discussion Forums will be

reviewed periodically by The Linux Foundation staff, but it is primarily a community resource, not an 'ask the instructor' service.

To learn more tips on how to use them, read the following article: "*Getting the Most Out of the edX Discussion Forums*".

Course Timing

This course is entirely self-paced; there is no fixed schedule for going through the material. You can go through the course at your own pace, and you will always be returned to exactly where you left off when you come back to start a new session. However, we still suggest you avoid long breaks in between periods of work, as learning will be faster and content retention improved.

The chapters in the course have been designed to build on one another. It is probably best to work through them in sequence; if you skip or only skim some chapters quickly, you may find there are topics being discussed you have not been exposed to yet. But this is all self-paced and you can always go back, so you can thread your own path through the material.

Learning Aids

Besides simple exposition through text and figures, this course uses several additional methods to present the learning material, including videos, use cases, labs, external resources, and knowledge check questions (Verified Certificate track only).

Audit and Verified Tracks

You can enroll into an audit or a verified track. In an audit track, you will have access to all ungraded course content: course readings, videos, and learning aids, but no certificates are awarded when auditing. You will not be able to access any graded content (knowledge check questions at the end of each chapter, and the final exam).

In order to receive a certificate, you will need to obtain a passing grade (please refer to the “Grading” section below), verify your identity with edX, and pay a fee. Once all edX requirements have been met, you can download your certificate from the Progress tab.

To learn more about audit and verified tracks, visit edX Help Center > Certificates.

Grading (Verified Certificate track only)

At the end of each chapter, you will have a set of graded **knowledge check questions**, that are meant to further check your understanding of the material presented. The grades obtained by answering these knowledge check questions will represent **20%** of your final grade.

The remaining **80%** of your final grade is represented by the score obtained in the **final exam**. The final exam is located at the end of the course and it consists of 20 questions.

You will have a maximum of two attempts to answer each knowledge check and final exam question (other than True/False questions, in which case, you have only one attempt). You are free to reference your notes, screens from the course, etc., and there is no time limit on how long you can spend on a question. You can always skip a question and come back to it later.

In order to complete this course with a passing grade, you must obtain a passing score (knowledge check and final exam) of minimum 70%.

Course Progress and Completion (Verified Certificate track only)

Once you complete the course (including knowledge check questions and final exam), you will want to know if you have passed. You will be able to see your completion status using the **Progress** tab at the top of your screen, which will clearly indicate whether or not you have achieved a passing score.

Professional Certificate Program

Professional Certificate programs are a series of courses designed by industry leaders and top universities to build and enhance critical professional skills needed to succeed in today's most in-demand fields.

To learn more about our Professional Certificates, visit Secure Software Development Fundamentals Professional Certificate, Blockchain for Business Professional Certificate, 5G Strategy for Business Leaders Professional Certificate, Developing Blockchain-Based Identity Applications Professional Certificate and Introduction to DevOps: Practices and Tools.

About The Linux Foundation

The Linux Foundation provides a neutral, trusted hub for developers to code, manage, and scale open technology projects. Founded in 2000, The Linux Foundation is supported by more than 1,000 members and is the world's leading home for collaboration on open source software, open standards, open data and open hardware. The Linux Foundation's methodology focuses on leveraging best practices and addressing the needs of contributors, users and solution providers to create sustainable models for open collaboration.

The Linux Foundation hosts Linux, the world's largest and most pervasive open source software project in history. It is also home to Linux creator Linus Torvalds and lead maintainer Greg Kroah-Hartman. The success of Linux has catalyzed growth in the open source community, demonstrating the commercial efficacy of open source and inspiring countless new projects across all industries and levels of the technology stack.

As a result, the Linux Foundation today hosts far more than Linux; it is the umbrella for many critical open source projects that power corporations today, spanning virtually all industry sectors. Some of the technologies we focus on include big data and analytics, networking, embedded systems and IoT, web tools, cloud computing, edge computing, automotive, security, blockchain, and many more.

The Linux Foundation Events

Over 85,000 open source technologists and leaders worldwide gather at Linux Foundation events annually to share ideas, learn and collaborate. Linux Foundation events are the meeting place of choice for open source maintainers, developers, architects, infrastructure managers, and sysadmins and technologists leading open source program offices, and other critical leadership functions.

These events are the best place to gain visibility within the open source community quickly and advance open source development work by forming connections with the people evaluating and creating the next generation of technology. They provide a forum to share and gain knowledge, help organizations identify software trends early to inform future technology investments, connect employers with talent, and showcase technologies and services to influential open source professionals, media, and analysts around the globe.

The Linux Foundation hosts an increasing number of events each year, including:

- Open Source Summit North America, Europe, and Japan
- Embedded Linux Conference North America and Europe
- Open Networking & Edge Summit
- KubeCon + CloudNativeCon North America, Europe, and China
- Automotive Linux Summit
- KVM Forum
- Linux Storage Filesystem and Memory Management Summit
- Linux Security Summit North America and Europe
- Linux Kernel Maintainer Summit
- The Linux Foundation Member Summit
- Open Compliance Summit
- And many more.

To learn more about The Linux Foundation events and to register, click here.

The Linux Foundation Training

The Linux Foundation offers several types of training:

- Classroom
- Online

- On-site
- Events-based.

To get more information about specific courses offered by The Linux Foundation, click here.

The Linux Foundation Certifications

The Linux Foundation certifications give you a way to differentiate yourself in a job market that's hungry for your skills. We've taken a new, innovative approach to open source certification that allows you to showcase your skills in a way that other peers will respect and employers will trust:

- You can take your certification from any computer, anywhere, at any time
- The certification exams are performance-based
- The exams are distribution-flexible
- The exams are up-to-date, testing knowledge and skills that actually matter in today's IT environment.

The Linux Foundation and its collaborative projects currently offer the following certifications:

- Linux Foundation Certified IT Associate (LFCA)
- Linux Foundation Certified System Administrator (LFCS)
- Linux Foundation Certified Engineer (LFCE)
- Certified Kubernetes Administrator (CKA)
- Certified Kubernetes Application Developer (CKAD)
- Certified Kubernetes Security Specialist (CKS)
- Certified Hyperledger Fabric Administrator (CHFA)
- Certified Hyperledger Fabric Developer (CHFD)
- Certified ONAP Professional (COP)
- Cloud Foundry Certified Developer (CFCD)
- FinOps Certified Practitioner (FOCP)
- OpenJS Node.js Application Developer (JSNAD)
- OpenJS Node.js Services Developers (JSNSD)

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