



IIT KANPUR
Indian Institute of Technology Kanpur

simplilearn



PROFESSIONAL CERTIFICATE PROGRAM IN

BLOCKCHAIN



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About the Program

Fast-track your career in the emerging blockchain area with this acclaimed Blockchain Certification Program, in partnership with IIT Kanpur. This program features the perfect mix of theory, case studies, and extensive hands-on practicum. Learners will receive a comprehensive blockchain education while leveraging IIT Kanpur's academic excellence and expertise in this growing field.

This Blockchain Certification Program is designed for both graduates and experienced professionals in multiple industries. A comprehensive blockchain education through a blend of online self-paced videos, live virtual classes, hands-on projects, and labs. Learners will also get access to mentorship sessions that provide a high-engagement learning experience and real-world applications to help master essential blockchain skills. This blockchain certification program covers concepts of Bitcoin, Hyperledger, Ethereum, Ripple and Multichain blockchain platforms. In this blockchain course, learn about private blockchain networks, smart contracts, applications and architecture using Ethereum.



Key Features of the Professional Blockchain Certification Program By IIT Kanpur



Blockchain Certification
by IIT Kanpur



4+ hands-on projects
in integrated labs



Industry Oriented
Capstone Projects



Masterclasses from
IIT Kanpur faculty



8X higher live
interaction with live
online classes by
industry experts



Simplilearn
Job Assistance
with Hrist
(India Only)



About the Professional Blockchain Certification Program By IIT Kanpur

IIT Kanpur is among the most prestigious and oldest educational institutes in India that offers various undergraduate, postgraduate, and integrated research programs in the field of engineering, science, management and design.

This Blockchain certification program covers concepts of Bitcoin, Hyperledger, Ethereum, and Multichain blockchain platforms. In this blockchain course, learn about private blockchain networks, smart contracts, applications and architecture using Ethereum. . Upon completion of this professional Blockchain Certification program, you will have a functional understanding of the latest relevant skills on blockchain.

About Simplilearn

Simplilearn is the world's #1 online bootcamp provider that enables learners through rigorous and highly specialized training. We focus on emerging technologies and processes that are transforming the digital world, at a fraction of the cost and time as traditional approaches. Over one million professionals and 2000 corporate training organizations have harnessed our award-winning programs to achieve their career and business goals.



Program Eligibility Criteria and Application Process

Those wishing to enroll in this Blockchain Certification program by IIT Kanpur will be required to apply for admission.

Eligibility Criteria

For admission to this Blockchain certification program candidate must have basic mathematical skills:

- ✓ 2+ years of work experience (preferred)
- ✓ Basic understanding of programming (preferred)

Application Process

The application process consists of three simple steps. An offer of admission will be made to the selected candidates and accepted by the candidates by paying the admission fee.

STEP 1 SUBMIT AN APPLICATION

Complete the application and include a brief statement of purpose. The latter informs our admissions counselors why you're interested and qualified for the program.

STEP 2 APPLICATION REVIEW

A panel of admissions counselors will review your application and statement of purpose to determine whether you qualify for acceptance.

STEP 3 ADMISSION

An offer of admission will be made to qualified candidates. You can accept this offer by paying the program fee.



Talk to an Admissions Counselor

We have a team of dedicated admissions counselors who are here to help guide you in applying to the program. They are available to:

- ✓ Address questions related to the application
- ✓ Assist with financial aid (if required)
- ✓ Help you resolve your questions and understand the program



Program Outcomes

Understand blockchain technology and key concepts such as cryptography and cryptocurrency.



Understand blockchain technology and key concepts such as cryptography and cryptocurrency concepts



Get a deeper understanding of Bitcoin and its network



Understand what distributed ledger and hyperledger means



Architect and develop applications on Ethereum Blockchain



Learn about consensus, transactions, work flows, and networks



Get hands-on experience with a capstone on industry-relevant use cases



Understand and learn about smart contracts



Who Should Enroll in this Program?

This program caters to graduates in any discipline and working professionals from diverse backgrounds and basic programming knowledge is good to have. The diversity of our students adds richness to class discussions and interactions.

The Blockchain market is expected to reach USD 39.7 billion by 2025, at a growth rate of 67.3 percent. This program prepares both new and experienced professionals — with a passion for blockchain and a technical

background — for a thriving career in blockchain. Suitable candidates include:

- ✓ Business analysts
- ✓ Developers
- ✓ Product managers
- ✓ Project managers
- ✓ Solution architects
- ✓ Team leads
- ✓ Students



Learning Path Visualization

Blockchain Certification

Gain insights into the world of Blockchain and current real-world applications.





Module 1: Fundamentals of Blockchain

Module Curriculum:

Lesson 1: Introduction to Blockchain

- ✓ Challenges Faced by Modern Businesses
- ✓ What is Blockchain?
- ✓ Building Blocks of Blockchain
- ✓ Types of Blockchain
- ✓ Knowledge Check

Lesson 2: Blockchain Pillars

- ✓ Introduction to Blockchain Pillars
- ✓ Cryptography
- ✓ Consensus
- ✓ Distributed Ledger
- ✓ Assisted Practice: Send a Message Using Symmetric Cryptography
- ✓ Assisted Practice: Sign a Message Using Asymmetric Cryptography
- ✓ Assisted Practice: Generate Hash Using Hash function
- ✓ Assisted Practice: Generate a Nonce Value
- ✓ Assisted Practice: Working on Distributed Ledger
- ✓ Assisted Practice: Working on Blockchain Transaction
- ✓ Knowledge Check
- ✓ LEP 1: Create Blockchain Network

Lesson 3: Bitcoin Blockchain

- ✓ Introduction to Bitcoin
- ✓ Bitcoin Wallets
- ✓ Bitcoin Block
- ✓ Bitcoin Transaction



- ✓ Bitcoin Scripts
- ✓ Bitcoin Attacks
- ✓ Bitcoin Network
- ✓ Bitcoin Mining
- ✓ Assisted practice: Install a Software Wallet (combine software and web wallet)
- ✓ Assisted practice: Generate a Paper Wallet
- ✓ Assisted practice: Generate a Web Wallet
- ✓ Assisted Practice: Review and Analyze a Bitcoin Block on Explorer
- ✓ Assisted Practice: Analyze a Bitcoin Transaction
- ✓ Knowledge Check
- ✓ LEP 2: Conduct a Transaction Using Electrum Wallet

Lesson 4: Ethereum Blockchain

- ✓ Introduction to Ethereum
- ✓ Swarm and whisper
- ✓ Remix IDE
- ✓ Truffle Framework
- ✓ Ethereum Networks
- ✓ Ethereum Wallets
- ✓ Ethereum Clients
- ✓ Web3.js
- ✓ NFT
- ✓ Assisted Practice: Exploring the Ethereum Mainnet
- ✓ Assisted Practice: Explore an Ethereum Test Network
- ✓ Assisted Practice: Install the Ganache Blockchain
- ✓ Assisted Practice: Explore the Ganache Blockchain
- ✓ Assisted Practice: Install Metamask and Set up the Wallet
- ✓ Assisted Practice: Connect Metamask to a Ganache Test Network
- ✓ Assisted Practice: Install Geth Client
- ✓ Assisted Practice: Set up a Private Blockchain node Network using geth
- ✓ LEP 3: Ether Transaction Using Metamask



Lesson 5: Enterprises Blockchain

- ✓ Enterprise Blockchain
- ✓ Hyperledger
- ✓ Hyperledger Sawtooth
- ✓ Hyperledger Iroha
- ✓ Hyperledger Indy
- ✓ Hyperledger Burrows
- ✓ Hyperledger Fabric
- ✓ Hyperledger Fabric Transaction
- ✓ Fabric Network
- ✓ Fabric Network Types
- ✓ Fabric Explorer
- ✓ Node Js
- ✓ R3 Corda
- ✓ Corda Network
- ✓ Assisted Practise: Setup Hyperledger Fabric Prerequisite
- ✓ Assisted Practise: Setup Hyperledger Fabric
- ✓ Assisted Practise: Start and stop test network
- ✓ Assisted Practice: Explorer
- ✓ Assisted Practice: Create Node Js Application
- ✓ Assisted Practice: Create a Web Application using the Expressjs file approach
- ✓ Assisted Practice: Create Web Application using Expressjs Node Project Approach
- ✓ Knowledge Check
- ✓ LEP 4: Transform the Supply Chain



Module 2: Blockchain Applications And Architecture

Module Curriculum:

Lesson 1: Ethereum Smart Contracts

- ✓ Smart Contract Lifecycle
- ✓ Solidity
- ✓ Solidity Variables
- ✓ Solidity Compilation and Deployment
- ✓ Solidity Functions
- ✓ Truffle
- ✓ Security Consideration
- ✓ Web3
- ✓ Assisted Practice: Generate the ABI and Bytecode of a Smart Contract
- ✓ Assisted Practice: Deploy a Smart Contract to Ganache Network
- ✓ Assisted Practice: Develop a Smart contract that stores ethers and transfers to a personal account
- ✓ Assisted Practice: Price Event Smart Contract
- ✓ Assisted Practice: Develop a Property Transfer Smart Contract using Remix IDE
- ✓ Assisted Practice: Create a Custom Token and Deploy it on Ropsten Network
- ✓ Assisted Practice: Truffle Setup and create a project
- ✓ Assisted Practice: Truffle Create MarketPlace contract
- ✓ Assisted Practice: Compile MarketPlace contract
- ✓ Assisted Practice: Deploy MarketPlace contract
- ✓ Assisted Practice: Access Smart Contracts Functions from the Frontend
- ✓ Knowledge Check
- ✓ LEP 1: Creating a Custom Bank Contract



Lesson 2: Hyperledger Fabric Chaincode

- ✓ Chaincode
- ✓ Gradle
- ✓ Chaincode Java API
- ✓ Chaincode Development
- ✓ Chaincode Package, Install, Approve
- ✓ Assisted Practice: Set up Development Prerequisites
- ✓ Assisted Practice: Create New Gradle Project for Car Showroom
- ✓ Assisted Practice: Create Chaincode for Car Showroom
- ✓ Assisted Practice: Package the Chaincode
- ✓ Assisted Practice: Install the Chaincode
- ✓ Assisted Practice: Approve the Chaincode
- ✓ Assisted Practice: Commit the Chaincode
- ✓ Assisted Practice: Access Chaincode Functions
- ✓ Assisted Practice: Chaincode Lifecycle steps from a shell file
- ✓ Knowledge Check
- ✓ LEP 2: Develop Chaincode for Property Ownership Application

Lesson 3: Hyperledger Fabric SDK

- ✓ Fabric SDK Introduction
- ✓ Node SDK
- ✓ Assisted practice: Enroll Admin User
- ✓ Assisted Practice: Register and Enroll Client User
- ✓ Assisted Practice: Access Chaincode Functions
- ✓ Assisted Practice: Create Node Project and add dependencies
- ✓ Assisted Practice: Enroll admin user to the network
- ✓ Assisted Practice: Enroll register and enroll client users to the network
- ✓ Assisted Practice: Access Chaincode Functions using Rest API
- ✓ Knowledge Check
- ✓ LEP 3: Access Property Ownership Chaincode using Java SDK



Lesson 4: Multichain

- ✓ Introduction to Multichain
- ✓ Multichain Installation
- ✓ Create a Multichain Instance
- ✓ Multichain Assets
- ✓ Multichain Streams
- ✓ Multichain Consensus
- ✓ Multichain API
- ✓ Assisted Practice: Set up Multichain in the Local Machine
- ✓ Assisted Practice: Create Multichain Instance with Two Nodes
- ✓ Assisted Practice: Create a Multichain Asset and Transfer It
- ✓ Assisted Practice: Create a Multichain Stream to Publish Data
- ✓ Assisted Practice: Perform Mining in Multichain
- ✓ Assisted Practice: Access Functions Using Multichain API
- ✓ Knowledge Check
- ✓ LEP 4: Create a Private Multichain Blockchain

Lesson 5: IOTA and Blockchain use cases

- ✓ Introduction to IOTA
- ✓ Traditional Blockchain Challenges
- ✓ Healthcare Use Cases
- ✓ Government Use Cases
- ✓ Finance Use Cases
- ✓ Supply Chain Use Cases
- ✓ Knowledge Check

Capstone Projects

Capstone Project 1: Farm Supply Chain

Description:

Many people across the globe are getting sick due to food hygiene. A better tracking technique is required to trace back the origin of the food item so that the end-user can authenticate that food item and consume that without any worry.

Background of the problem statement:

Food quality and safety are important topics today as everyone is concerned about the quality of the food that is being consumed.

Food items like fruits and vegetables generally do not have any expiry date mentioned so it becomes really important to understand the origin of these food items and know when were it sent to the distributor from the farmer and so on. The following cycle is generally followed in the fruit supply chain:

1. Producer: The producer can harvest fruits and vegetables, sell them to a distributor, and track authenticity.
2. Distributor: The distributor can buy and distribute the fruits and track authenticity.
3. Retailer: The retailer can buy and put the fruits for sale and track authenticity.
4. Consumer: The consumer can buy the fruits and track authenticity.

Capstone Project 2: Decentralized Patient Record Storage

Description:

The patient record is one of the important assets that is currently centralized, maintained, and managed by hospitals.

Some countries have moved to Electronic Health Record (EHR), and many countries still follow the old method to store the patient and medical details. Around 80 to 90% of the hospitals in the United States have adopted basic EHR systems, which have a lot of problems related to privacy, security, and ownership of these health records.

Even after moving to EHR, the patient record is completely owned and controlled by hospitals, and being the owner of that record, a patient does not have access to the data and has to always reach out to hospitals to get it.

Data consolidation is one of the biggest challenges as every hospital stores these EHRs on their server. The patients need to access different EHRs to consolidate their complete medical history.

Since hospitals own the EHRs, they have full control and can manipulate the data at any moment. They can even sell the data to research organization and earn a good amount of money.

Along with the patient record, doctor authenticity is another challenge that is faced as there is no direct way to check if the doctor is real or not.

Capstone Project 3: Trade Finance

Description:

Trade finance enables transactions between buyers and sellers across the globe. A letter of Credit (LC) plays an important role in the trade finance process. The buyer bank issues a Letter of Credit (LC) to the seller bank, which acts as a payment guarantee in exchange for goods.

The current Letter of Credit process in trade finance has a lot of challenges:

- ✔ Involvement of large volume of paper documents: Importer, exporter, importer, and exporter bank needs to maintain these documents. This reliance on documents usually has drawbacks, including the cost and time required to prepare, transmit, and check these documents. Paper documents may also be open to errors and even forgery.
- ✔ Delayed payment: Multiple intermediaries must verify the funds have been delivered to the importer as agreed before the disbursement of funds to the exporting bank.
- ✔ Invoice factoring: Exporters use invoices to achieve short-term financing from multiple banks, adding additional risk in the event the delivery of goods fails
- ✔ Multiple versions of the truth: As financials are sent from one entity to another, significant version control challenges exist as changes are made

Capstone Project 4 : Voting with Blockchain

Description:

The election is a fundamental pillar of a democratic system, which enables the public to express their views in the form of a vote. Due to their significance in our society, the election process should be transparent and reliable to ensure participants of its credibility.

Online voting is a trend that is gaining momentum in modern society. It has great potential to decrease organizational costs and increase voter turnout. It eliminates the need to print ballot papers or open polling stations—voters can vote from wherever there is an Internet connection. Despite these benefits, online voting solutions are viewed with a great deal of caution because of:

- ✔ Eligibility: Only legitimate voters should be able to take part in voting.
- ✔ Nonreusability: Each voter can vote only once.
- ✔ Privacy: No one except the voter can obtain information about the voter's choice.
- ✔ Fairness: No one can obtain intermediate voting results.
- ✔ Soundness: Invalid ballots should be detected and not taken into account during tallying.
- ✔ Completeness: All valid ballots should be tallied correctly.

Blockchain technology came into the ground to overcome these issues. It offers decentralized nodes for electronic voting and is used to produce electronic voting systems for their end-to-end verification advantages. This technology is a replacement for traditional electronic voting solutions with distributed, non-repudiation, and security protection characteristics.

In this use case, three parties are involved:



1. Voting Admin

- ✓ Start election
- ✓ End election
- ✓ Show results

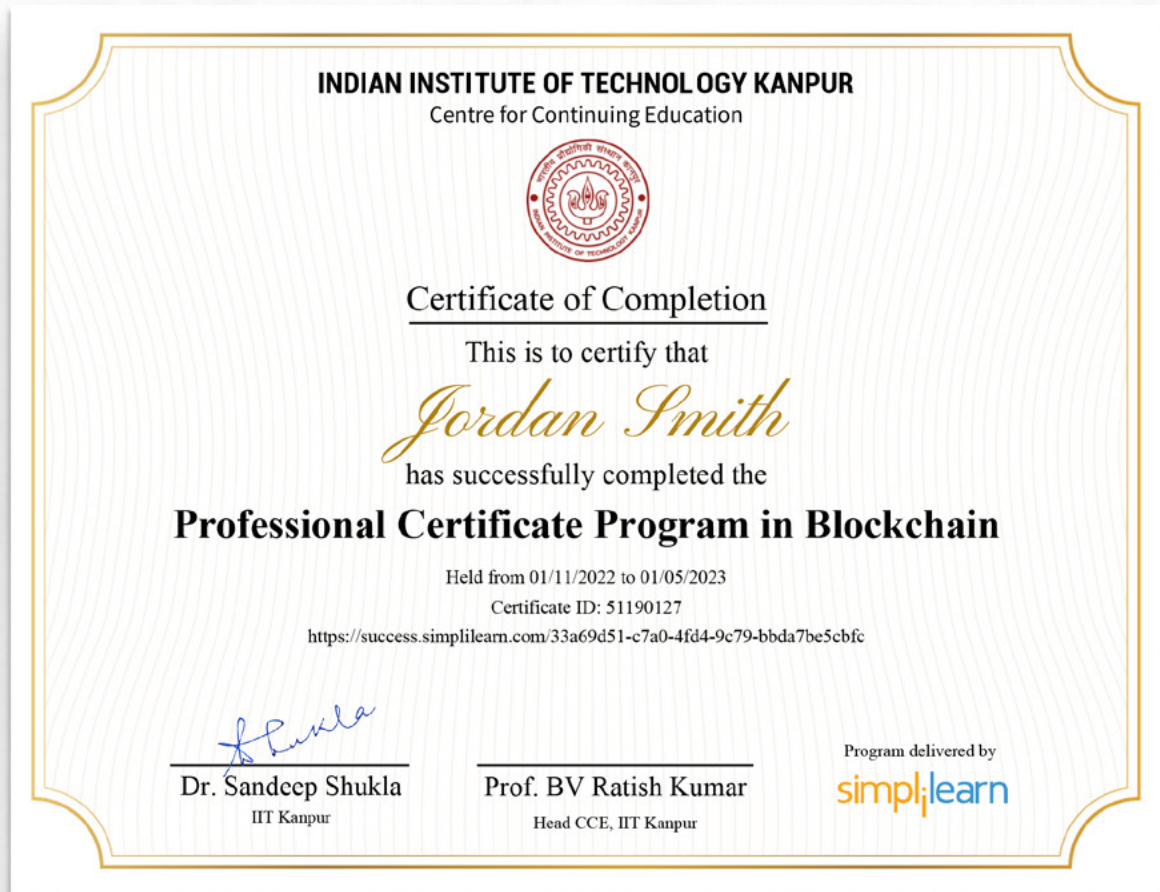
2. Voter

- ✓ Register a new voter
- ✓ Vote for the candidate
- ✓ Delegate the voting right
- ✓ View voter details

3. Candidate

- ✓ Register a new candidate
- ✓ View the list of candidates
- ✓ View candidate details

Certificate



Upon completion of this Blockchain Certification Training Program, in partnership with IIT Kanpur, you will receive the Blockchain Certification from IIT Kanpur. This certificate will testify to your skills as a blockchain expert.



Advisory Board Members



Sandeep Shukla

Professor, Computer Science and Engineering
at Indian Institute of Technology, Kanpur

Sandeep Shukla is the Coordinator, Interdisciplinary Center for Cyber Security and Cyber Defense of Critical Infrastructure, IIT Kanpur. He has a Ph.D. and MS in Computer Science from the State University of New York and 28+ years of experience as a technology professional and revered academic.



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