

# Blockchain Bootcamp



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# Program Overview

Accelerate your career with the acclaimed Caltech Blockchain Bootcamp, delivered in collaboration with Caltech CTME. This program features the perfect mix of theory and extensive hands-on practice to master blockchain concepts and tools. It provides a comprehensive training on blockchain while leveraging Caltech's academic excellence

Designed for working professionals, this bootcamp provides a deep-dive into blockchain through a blend of online self-paced videos, live virtual classes, hands-on projects, and integrated labs — with mentorship sessions to provide a high-engagement learning experience.

This program offers in-depth exposure to technologies including Bitcoin, Hyperledger, Solidity, Multichain, Ethereum, Truffle, and Java to prepare you for an exciting career in blockchain.





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# About Caltech

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Founded in 1891, Caltech is a world-renowned science and engineering institute that marshals some of the world's brightest minds and most innovative tools to address fundamental scientific questions and pressing societal challenges. Caltech prizes excellence and ambition. The contributions of Caltech's faculty and alumni have earned national and international recognition, including 38 Nobel Prizes and nearly 60 National Medals of Science. The Institute manages the Jet Propulsion Laboratory (JPL) for NASA.

CTME is embedded in Caltech's Division of Engineering and Applied Science. Caltech CTME has a unique role to play in applying the capabilities of scientists and engineers to the challenges of today's technology-driven businesses. Caltech CTME applies executive education and professional development directly to real-world problems. Caltech CTME experts teach the tools and perspectives that elevate careers and help companies achieve their goals



# Key Features of the Program



*Caltech CTME program completion certificate*



*Industry relevant hands-on projects*



*Earn up to 15 CEUs from Caltech CTME*



*Seamless access to integrated labs*



*Masterclasses delivered by distinguished Caltech faculty.*



*Capstone projects*



*Caltech CTME Circle Membership*



*Simplilearn's Career Assistance to help you get noticed by top hiring companies*



*Online convocation by Caltech CTME Program Director*



*8X higher interaction in live online classes by industry experts*



*Physical certificate from Caltech CTME (on request)*

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# Eligibility Criteria

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For admission to this Blockchain Certification Program, candidates must have:

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



# Application Process

Candidates can apply to the Caltech Blockchain Bootcamp in 3 simple steps:



## Submit an Application

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



## Application Review

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



## Admission

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

Qualified candidates can accept the offer by paying the program fee

## Talk to an Admissions Counselor

We have a team of dedicated admissions counselors here to help guide you in the application process and related matters.

They are available to:

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



# Who is this Bootcamp Ideal for?

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

- ✓ Full Stack Developer
- ✓ Software Developer
- ✓ Front-end Web Developer
- ✓ Back-end Web Developer

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:

- ✓ Application Development Manager
- ✓ Technical Project Manager
- ✓ QA and Test Engineer

# Program Outcomes



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



Learn about consensus, transactions, workflows, and networks



Get a deeper understanding of Bitcoin and its network



Understand and learn about smart contracts



Understand what distributed ledger and hyperledger means



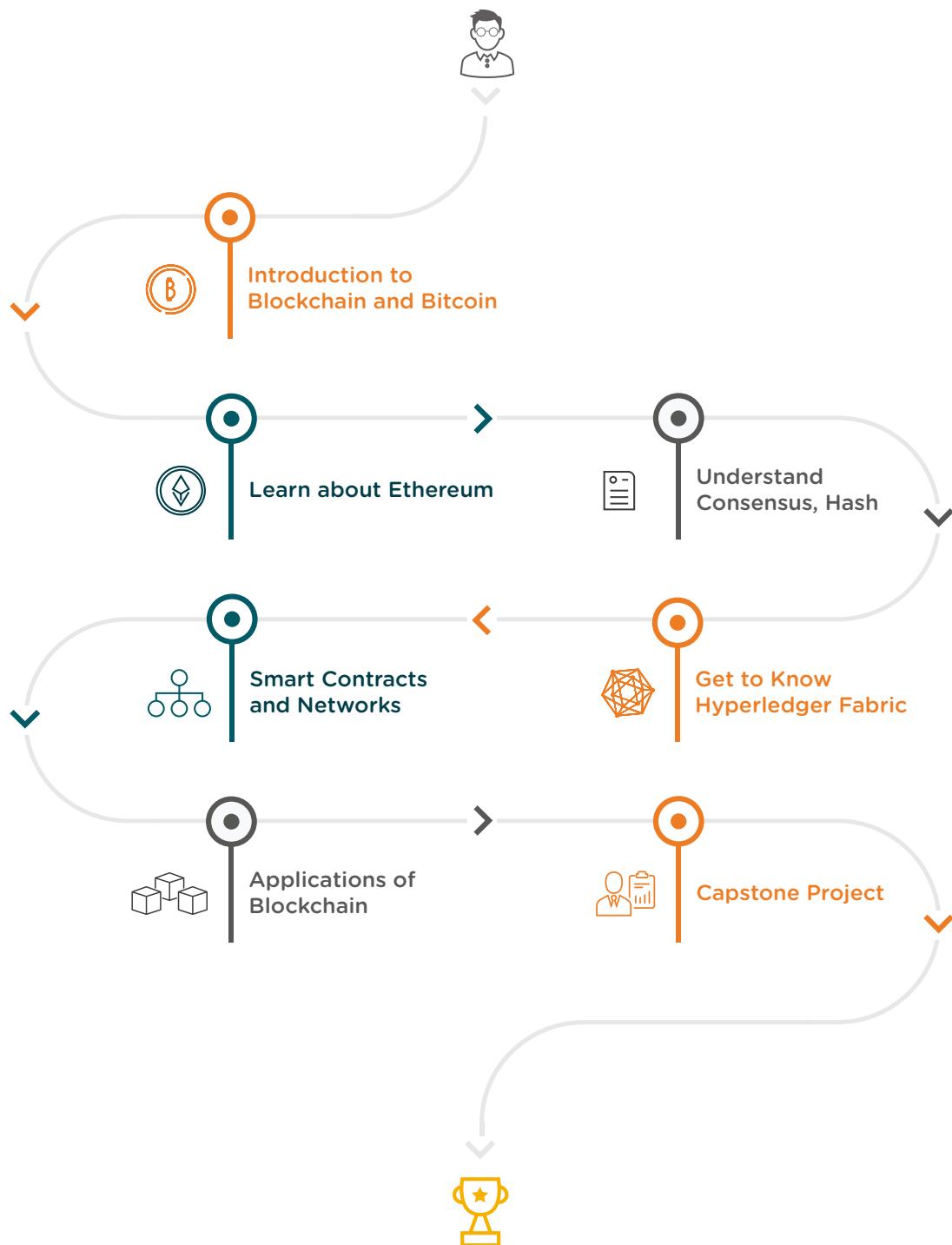
Get hands-on experience with a capstone on industry-relevant use cases



Architect and develop applications on Ethereum



# Learning Path



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# Fundamentals of Blockchain

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## STEP

1

2

## Module Curriculum

### Lesson 1: Course Introduction

- ✔ What Is Blockchain?
- ✔ Features of Blockchain
- ✔ Industries Using Blockchain
- ✔ Course Outline
- ✔ Course Outcome
- ✔ Course Components
- ✔ Customer Support

### Lesson 2: Introduction to Blockchain

- ✔ Challenges Faced by Modern Businesses
- ✔ What is Blockchain?
- ✔ Building Blocks of Blockchain
- ✔ Types of Blockchain
- ✔ Knowledge check

### Lesson 3: Blockchain Pillars

- ✔ Introduction to Blockchain Pillars
- ✔ Cryptography
- ✔ Assisted Practice: Generate
- ✔ Public and Private Keys
- ✔ Assisted Practice: Send a Message Using Symmetric Cryptography
- ✔ Assisted Practice: Sign a Message Using Asymmetric Cryptography

- ✓ Assisted Practice: Generate Hash Using Hash function Consensus
- ✓ Assisted Practice: Generate a Nonce Value
- ✓ Distributed Ledger
- ✓ Assisted Practice: Working of Distributed Ledger
- ✓ Assisted Practice: Working of Blockchain Transaction
- ✓ Knowledge Check
- ✓ Lesson End Project: Create Blockchain Network

## Lesson 4: Bitcoin Blockchain

- ✓ Introduction to Bitcoin
- ✓ Bitcoin Wallets
- ✓ Assisted Practice: Install a Software Wallet
- ✓ Assisted Practice: Generate a Paper Wallet
- ✓ Assisted Practice: Generate a Web Wallet
- ✓ Bitcoin Block
- ✓ Assisted Practice: Review and Analyze a Bitcoin Block on Explorer
- ✓ Bitcoin Transaction
- ✓ Assisted Practice: Analyze a Bitcoin Transaction
- ✓ Bitcoin Scripts
- ✓ Bitcoin Network

- ✓ Bitcoin Mining
- ✓ Knowledge Check
- ✓ Lesson End Project: Conduct a Transaction Using Electrum Wallet

## Lesson 5: Ethereum Blockchain

- ✓ Introduction to Ethereum
- ✓ Ethereum Networks
- ✓ 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
- ✓ Ethereum Wallets
- ✓ Assisted Practice: Install Metamask and Set up the Wallet
- ✓ Assisted Practice: Connect Metamask to a Ganache Test Network
- ✓ Assisted Practice: Install and Explore the Mist Wallet
- ✓ Ethereum Clients
- ✓ Assisted Practice: Install Geth Client
- ✓ Assisted Practice: Set up a Private Blockchain Network
- ✓ Knowledge Check
- ✓ Lesson End Project: Ether Transaction Using Ganache

## Lesson 6: Enterprise Blockchain

- ✓ Enterprise Blockchain
- ✓ Hyperledger
- ✓ Hyperledger Sawtooth
- ✓ Assisted Practise: Setup Sawtooth Network and Create Basic Transactions
- ✓ Hyperledger Iroha
- ✓ Assisted Practise: Setup Iroha Network and Create Basic Transaction
- ✓ Hyperledger Indy
- ✓ Hyperledger Burrows
- ✓ Hyperledger Fabric
- ✓ Hyperledger Fabric Transaction
- ✓ Fabric Network
- ✓ Assisted Practise: Setup Hyperledger Fabric Prerequisite
- ✓ Assisted Practise: Setup Hyperledger Fabric
- ✓ Fabric Network Types
- ✓ Assisted Practise: Start and stop test network
- ✓ R3 Corda
- ✓ Corda Network
- ✓ Knowledge Check
- ✓ Lesson End Project: Transform the Supply Chain



# Blockchain Applications and Architecture

STEP

1

2

## Module Curriculum:

### Lesson 1: Course Introduction

- ✓ Learning Path
- ✓ Program Outline
- ✓ Course Outline
- ✓ Skills Covered
- ✓ Course Components
- ✓ Course Completion Criteria
- ✓ Customer Support

### Lesson 2: Ethereum Smart Contracts

- ✓ Remix IDE
- ✓ Assisted Practice: Explore the Browser-based Remix IDE
- ✓ Assisted Practice: Connect Remix IDE to Ganache and Ropsten Test Networks
- ✓ Smart Contract Lifecycle
- ✓ Solidity
- ✓ Solidity State and Variable
- ✓ Types
- ✓ Solidity Functions
- ✓ Assisted Practice: Develop a Property Transfer Smart Contract
- ✓ Unassisted Practice: Develop a Library Smart Contract
- ✓ Web3

- ✓ Assisted Practice: Create a Custom Token and Deploy it on Ropsten Network
- ✓ Solidity Compilation and Deployment
- ✓ Assisted Practice: Generate the ABI and Bytecode of a Smart Contract
- ✓ Assisted Practice: Deploy a Smart Contract to Ganache Network
- ✓ Assisted Practice: Access Smart Contracts Functions from the Frontend
- ✓ Knowledge Check
- ✓ Lesson End Project: Creating a Custom Bank Contract

### Lesson 3: Hyperledger Fabric Chaincode

- ✓ Chaincode
- ✓ Gradle
- ✓ Chaincode Java API
- ✓ Chaincode Development
- ✓ Assisted Practice: Set up Development Prerequisites
- ✓ Assisted Practice: Create New Gradle Project for Car Showroom
- ✓ Assisted Practice: Create Chaincode for Car Showroom

- ✓ Chaincode Package, Install, Approve
- ✓ 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
- ✓ Knowledge Check
- ✓ Lesson End Project: Develop Chaincode for Property Ownership Application

### Lesson 4: Hyperledger Fabric SDK

- ✓ Fabric SDK Introduction
- ✓ Assisted Practice: Create Maven Project
- ✓ Assisted Practice: Enroll Admin User
- ✓ Assisted Practice: Register and Enroll Client User
- ✓ Assisted Practice: Access Chaincode Functions
- ✓ Knowledge Check
- ✓ Lesson End Project: Access Property Ownership Chaincode using Java SDK

## Lesson 5: Multichain

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

## Lesson 6: IOTA and Blockchain Use Cases

- ✓ Traditional Blockchain Challenges
- ✓ Introduction to IOTA
- ✓ Healthcare Use Cases
- ✓ Government Use Cases
- ✓ Finance Use Cases
- ✓ Supply Chain Use Cases
- ✓ Knowledge Check
- ✓ Creating a Decentralized Hospital Smart Contract

## Certificates



Upon successful completion of the Caltech Blockchain Bootcamp, you will receive a certificate of completion from Caltech CTME.



# Advisory Board Members



## Rick Hefner, Ph.D.

Program Director, Caltech Center for Technology & Management Education

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Rick Hefner, PhD, specializes in systems development and maintenance; project management; Lean Six Sigma; process improvement, technology transfer; and risk management. His experience spans over 35 years. Dr. Hefner recently served as Director of Process Management at Northrop Grumman Corporation, where he managed corporate process initiatives related to Lean Six Sigma and program management.

Previous positions at Northrop Grumman (formerly TRW) included managing technology process initiatives and helping to establish the corporate engineering and program management processes. Previously, at Aerospace Corporation, Dr. Hefner was the Director of their Software Development department. He served as an engineer, technical specialist, project manager, and section manager.

Dr. Hefner has also worked with companies in the communications, electronics, and health sciences industries, including Applied Physics Laboratory, Ares Management, Boeing, DRS Technologies, Herbalife, Honeywell, Jet Propulsion Laboratory, John Deere, L-3 WESCAM, Maytag, Motorola, Pacific Bell, Raytheon, Schlumberger, Southern California Edison, St. Jude Medical, Toshiba, U.S. Navy, and Xerox. Dr. Hefner is credited with over 200 publications and presentations. He earned his PhD from the University of California, Los Angeles, in applied dynamic systems control. He received his MS and BS from Purdue University in interdisciplinary engineering.



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