ROCHESTON® CERTIFIED
BLOCKCHAIN ENGINEER

Certified by Rocheston®

RCBE® Certification Program Guide

What is Blockchain?

A public registry of information collected through a network using the Internet is called a blockchain. The blockchain technology offers enormous potential due to the way in which information is processed.

Blockchain technology is not facilitated through an app, nor through a company; it is an innovative ... way of documenting data on the internet. The technology can be used to develop blockchain applications in a range of segments, including games, storage platforms, prediction markets, social networks and many more. It is also dubbed as 'The Internet 3.0' owing to its similarity to the Internet.

Information stored on a blockchain can take several forms. For instance—a transaction, denoting transfer of money, or the amount of electricity used by a light bulb can be stored using this technology. However, it requires verification from several devices such as tablets or computers on a network. Once a consensus or an agreement is reached between the devices to store using a blockchain, it cannot be altered, removed or disputed without the permission and knowledge of the parties who made that record in addition to the larger community.

Benefits of **Blockchain**

Information recorded on a blockchain exists as a database that is shared and continuously reconciled. It does not exist as a centralized network, which would make it vulnerable to hacking. Rather, it is hosted by millions of computers in tandem; the data is accessible to anyone on the internet

Blockchain technology, similar to the internet, comes with an additional layer of security. As information is stored in blocks across its network, the blockchain cannot be managed or controlled by a single entity, nor does it have a single point of failure.

The blockchain network exists in a state of agreement that automatically checks itself every ten minutes. It is a type of self-auditing ecosystem of digital value, where the network compiles every transaction that happens in ten-minute intervals.

The result is; two important properties:

Transparency

As transparency of data is embedded in the network, it is public by definition. Any unit of information on the block chain cannot be altered easily, and it would require a huge amount of computing power to override the entire network.
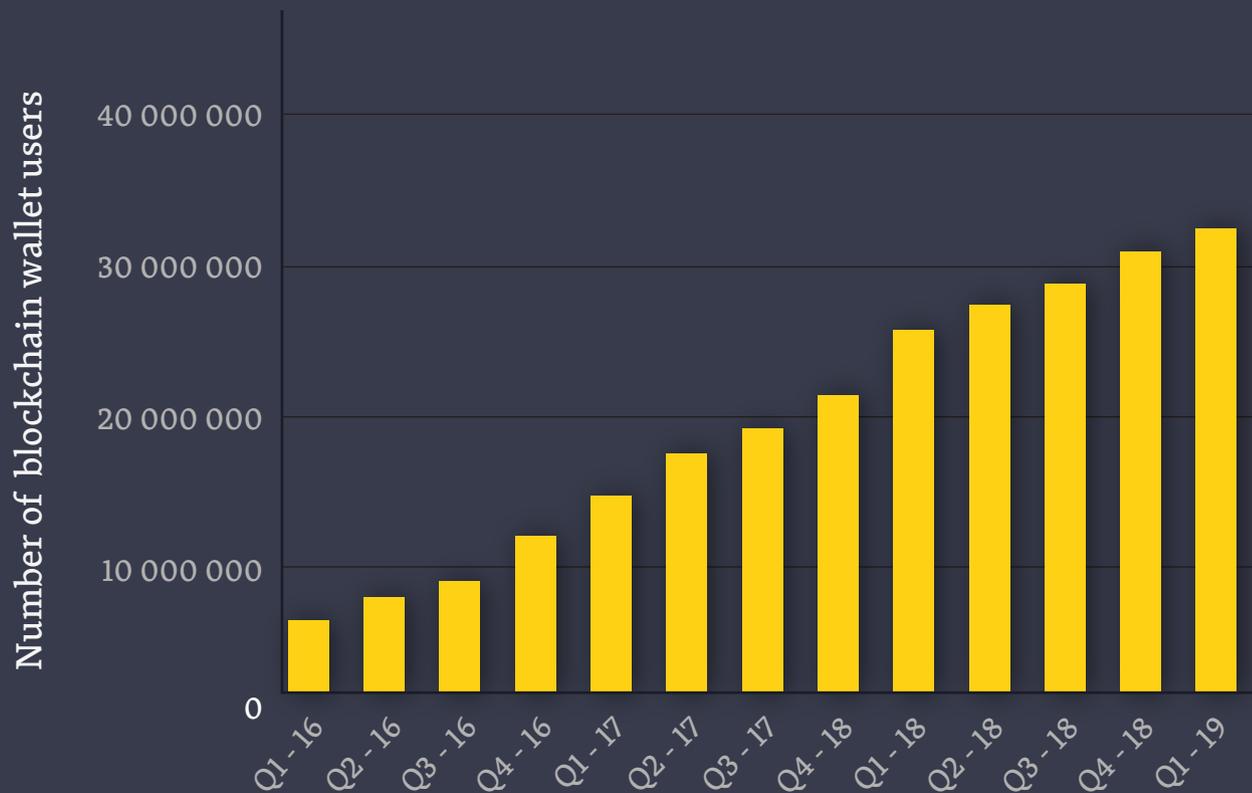
Blockchain Network

Any activity on a blockchain network is a function of the network as a whole. New implications would arise from this. Traditional commerce could become redundant as there will be a new way to verify transactions. Stock market trading could become simultaneous on the blockchain, and it can be used for publicly available record keeping such as land registry.

Blockchain Statistical Trends

- Global expenditure on blockchain solutions is expected to go from **1.5 billion in 2018 to an estimated 11.7 billion by 2022.**

- The financial sector accounts for over 60 percent of blockchain market value all over the world in 2018. However, the technology has crept in to almost every industry from agriculture to healthcare.

- Investment funding for blockchain startups has evolved from one million **U.S. dollars in 2012 to beyond one billion in 2017.**

- In 2018, a blockchain protocol generated investment amounting to 4.2 billion U.S. dollars in its initial coin offering. North America, and especially, the United States, currently leads the market in venture capital funding, with several major firms investing millions of dollars in it every year.

- The United States is currently seen as the global leader in blockchain technology, **China is not far behind, and is expected to overtake the US by 2020.**

- The biggest name in cryptocurrency is of course Bitcoin. In the fourth quarter of 2017, **Bitcoin had reached its peak with a 237.6 billion U.S. dollars market cap.**

- In the fourth quarter of 2018, the Bitcoin blockchain was approximately 200 gigabytes in size.

Number of Blockchain wallet users worldwide from 1st quarter 2016 to 1st quarter 2019

Number of blockchain wallet users

40 000 000	
30 000 000	
20 000 000	
10 000 000	
0	

Q1 - 16, Q2 - 16, Q3 - 16, Q4 - 16, Q1 - 17, Q2 - 17, Q3 - 17, Q4 - 18, Q1 - 18, Q2 - 18, Q3 - 18, Q4 - 18, Q1 - 19

Additional information:

Worldwide Blockchain: Q1 2016 to Q1 2019

Who will use **Blockchain?**

Currently, the finance market finds the strongest use for the technology e.g. International transactions. **There is also a high demand for blockchain developers.**

For these types of transactions using blockchain, middlemen would be cut off. While personal computing went mainstream with the invention of graphical user interface (GUI) in the form of a desktop, blockchain eliminated the risks of data being held centrally as data is held across a network.

Blockchain network is devoid of centralized points that are vulnerable to hackers. Storing data on blockchain can also make it incorruptible and online transactions are closely connected to the process of identity verification.

Its network lacks centralized points of vulnerability that computer hackers can exploit. Store your data on the blockchain and it is incorruptible. All the online transactions are connected to the identity verification processes.

As data is stored across a network, blockchain eliminates the risks associated with data storage in a single data center.

Important Objectives of RCBE

1. Transparency
2. Security
3. Inexpensive
4. Intellectual Property (IP) Management
5. Secure Platform
6. Creating a better sharing economy
7. Opening up manufacturing
8. Prevents payment scams
9. Transactions in minutes

1. Transparency

A clear, neat, and transparent network, is what people are looking for in future technologies. This makes blockchain technology, the preferred and most likeable choice among different technologies available in the market. In blockchain technology, everything is clearly displayed on the network, leaving no chance for discrepancy.

2. Security

Modern hackers use all the tricks of the trade to hack into devices for illegal purposes. Due to the increasing number of hackers breaking into devices, the need for security has risen exponentially, this is where blockchain technology promises to provide a robust security environment. Blockchain technology has been developed to be hack-proof, wherein if a hacker succeeds, all information on the block gets corrupted, making it the most secure network.

3. Inexpensive

Most traditional modes of financial transaction are rather expensive. On the contrary, with a Blockchain network, it is not necessary to invest in a brick and mortar model or pay huge commissions for financial services, as it reduces cost extensively.

4. Intellectual Property (IP) Management

Blockchain technology opens avenues for better cataloguing and protection of original work. Authors, artists, bloggers and the like are at the moment unable to easily record their work and prevent copyright infringement. The emergence of blockchain technology, will ensure that every piece of work gets properly catalogued without any complications.

5. Secure Platform

Blockchain technology is a powerful digital platform which has the strength to nullify all the discrepancies of a traditional network. It provides a platform that securely preserves the value of work or intellectual property.

6. Creating a better sharing economy

The blockchain technology offers a fluid method of conducting business It provides all suppliers and buyers a secure & trusted network to trade without fear. Blockchain ensures great support and security that encourages manufacturers and traders to confidently manage their businesses.
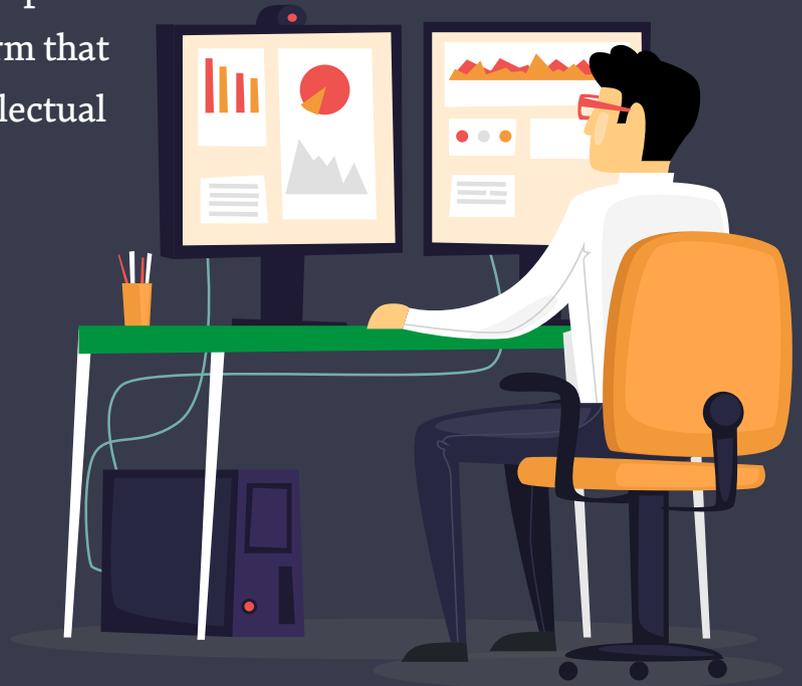
7. Opening up manufacturing

Today, 3D printing is a boon to many entrepreneurs, who look to bridge the gap between users and manufacturers. However, many businesses still prefer the centralized market skeptical to sell online, as their concerns are largely based on the protection of their IPs. Blockchain technology allows the user to safely save work, upload digital pictures of financial documents and digital signatures on the block or smart contract.

8. Prevents payment scams

As everything in blockchain is accounted and tracked, it is difficult for discrepancies and corruption to occur. Another reason why this technology is so secure, is because if a transaction occurs, digital signatures are required from both parties, to avoid any kind of fraud.

9. Transactions in minutes

Blockchain technology allows financial transactions in just a matter of minutes, without time wastage.

What is the role of an RCBE?

A Rocheston Certified Blockchain Engineer (RCBE) will identify opportunities for transformation/disruption through blockchain. This includes emerging opportunities in cryptocurrencies, ICOs and DAOs.

An RCBE will also develop enterprise-focused use-case and determine blockchain governance, business models, business operations, customer experience and partner/channel impacts.

They will develop the blockchain Lean Canvas and Blockchain business case for the Proof-of- Concept/MVP development.

They will establish blockchain expertise as a distinct and self-regulating profession.

An RCBE will create and support a Secure Data Sharing Network , Internal Communications Network and Sustainable Cybersecurity Ecosystem for their corporations.

They will provide training and support to their peers in terms of navigating Blockchain.

They will bring about a highly scalable and accessible Blockchain model to enable the company to grow faster than ever.

They will identify and provide inherent value for future Blockchain solutions and tokens through technological innovation.

Prerequisites of an RCBE

As the blockchain protocols are numerous and versatile, the base requirements of the courses are:

- Basic knowledge of software development processes
- Proficiency in at least one programming language
- Awareness of Cryptocurrencies and other Blockchain technologies

Skills You Will Learn **as an RCBE**

1. Learn to lead business outcomes
2. Embrace blockchain expertise as a service
3. Master of interoperability
4. Distributed ledger expertise
5. Become a "T" shape person
6. Understand platforms
7. Understand blockchain security
8. Learn to simplify
9. Drive blockchain architecture patterns
10. Know standards and ecosystems

1. Learn to lead business outcomes

Blockchain architecture relies less on business process simplification and more on technology, so understanding business outcomes is crucial. Business-led architecture explores data flows and helps in building direct connections between trading partners, suppliers and customers across the ecosystem. Understanding of business outcomes is essential all the way through to the value chain and partner ecosystem.

2. Embrace blockchain expertise as a service

Lead, develop proofs of concept and collaborate with consortiums and Blockchain as a Service (BaaS) providers. During the formation of consortiums, negotiation and collaboration skills are of importance.

3. Master of interoperability

As ledgers are interconnected across different technology platforms, it poses deployment risks and it is essential to cultivate an open source mindset. Learn to integrate with enterprise systems. This is crucial to reduce latency and lead business outcomes.

4. Distributed ledger expertise

Smart contracts are not supported by some blockchain frameworks. Gain expertise in distributed ledger technology to accelerate smart contracts development.

5. Become a "T" shape person

A blockchain engineer must not only possess core blockchain skills but also the long vertical stroke on the T, and the cross discipline broad skills on the horizontal part of the "T"—these are Design Thinking, DevOps, Agile and Continuous delivery.

While business and technology experience, experience in developing, designing, testing, deploying, and maintenance has its merits, success lies in utilizing disruptive technologies in unison than in solo fashion.

6. Understand platforms

As there are a multitude of frameworks, selecting the right blockchain platform is a key challenge for firms. Learn to identify the right use cases for the right blockchain platform. This is accomplished with a deep understanding of various blockchain platforms such as The Linux Foundation's Hyperledger Fabric, Ethereum, Ripple and R3 Corda.

7. Understand blockchain security

Security frameworks are constantly evolving for compliance, legal and regulatory needs. Attain key security skills such as public and private key cryptography, cryptographic hashing and curve digital signatures.
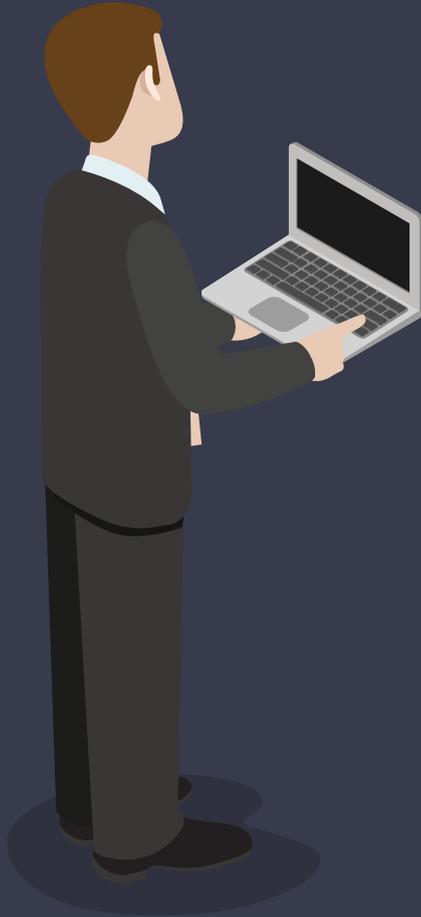
8. Learn to simplify

Learn to use blockchain to simplify business processes and drive business outcomes. Understand how partnering with service providers like IBM who can provide full range of capabilities including IBM Cloud Garage to ensures smooth deployment of a blockchain project.

9. Drive blockchain architecture patterns

Learn to create awareness in the industry on how a blockchain-based solution is more efficient, secure and cheaper than any of the current alternatives. Understand and review the technical designs of blockchain partners. Assist in the selection and planning process using alternative architecture skills

10. Know standards and ecosystems

Learn to participate in ISO/TC 307 initiatives and Hyperledger working groups to develop standards around terminology and concepts, personally identifiable information (PII), security risks and vulnerabilities. As blockchain is not a database technology, it requires a set of capabilities in blockchain principles and practices—and how they can be applied to a business environment.

Job Prospects for an RCBE

Due to Blockchain's large scale application potential, future RCBEs can come from the following fields:

- Programmers & Developers
- Software Engineers & Architects
- Application Architects
- Cryptocurrency Enthusiasts
- CTO, VP - Engineering, VP - Technologies
- Security Professionals, Administrators
- Govt. Officials
- Professors, Researches and Students

Is there a demand **for RCBE?**

With more corporationsadopting the benefits of Blockchain technology, below are some, (but not all), companies that are looking to hire blockchain engineers:

- Accenture
- IBM
- Oracle
- Walmart
- JPMorgan Chase
- FedEx
- Microsoft
- Facebook
- Circle
- KPMG
- Bank of America
- Amazon
- EY

and many many more.
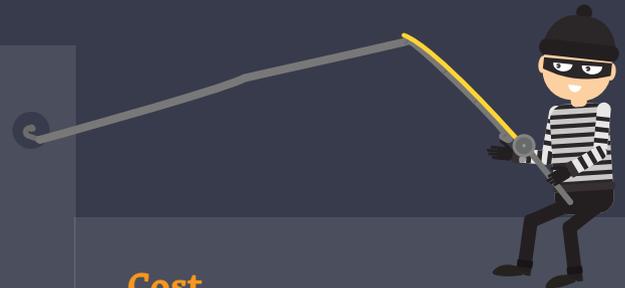
What will be the **course structure?**

What the course will consist of:

- A 5-day Training Program
- Time: 9:30 AM – 6 PM
- The Provision of an Active Web Portal
- Seminars Conducted by Qualified Engineers
- Best in-class environment
- Exam can be taken on Rocheston Cyberclass or Pearson VUE testing platform.

Cost

For pricing in your region, please contact the local distributor.

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THIS CERTIFICATE IS PRESENTED TO

Jason Springfield

FOR COMPLETING ALL THE REQUIREMENTS TO BECOME A
ROCHESTON CERTIFIED BLOCKCHAIN ENGINEER

HAJA MOHIDEEN
PRESIDENT & CEO

rcbe

ROCHESTON
NEW YORK
DISTINGUISHED

Modules: Blockchain

Module 1: Introduction to Blockchain

- What is Blockchain?
- Basics of Bitcoin and other Altcoins
- Understanding Ethereum ecosystem
- Raising new digital currency through Initial Coin Offering

Module 2: The Genesis

- Blockchain: Origin and Future
- Study of Cryptoeconomics
- Proof of stake (PoS) & Delegated PoS
- Future of Accounting vs Traditional Accounting Methodologies

Module 3: Types of Blockchain

- Public Blockchain
- Private Blockchain
- Consortium or Federated Blockchain

Module 4: Blockchain Nodes

- Bitcoin nodes
- Full Node
- Peer-to-peer (P2P) Networking

Module 5: Implementing Blockchain Disruptive Technology

- Immutability
- Provenance
- Decentralized Computing Infrastructure
- Blockchain Network
- Distributed Ledger Technology
- Hash functions and Digital Signatures
- Blockchain Mobile Wallet – Bitcoin and Ethereum

Module 6: Blockchain Architecture

- Transactions – Mechanism of using public and private keys
- Blocks – Importance of hash functions
- Mining – Factors for selecting mining hardware, mining with the right pool and choosing pool rewards
- Consensus Algorithms – Expanding scope of secured transactions through Dapps, DAOs, decentralized networks

Module 7: Blockchain Protocols and Platforms

- Bitcoin
- Ethereum
- Ripple
- Hyperledger
- Openchains
- IOTA
- LISK
- Hydrachain
- Corda

- Symbiont Distributed Ledger
- Chain
- BigChainDB
- Hard and Soft Forks

Module 8: Blockchain Community Building & Its Ecosystem

- Blockchain as a Service (BaaS)
  - Enterprise Ethereum Alliance (EEA)
  - Amazon(AWS), Microsoft(Azure), IBM Blockchain, Accenture Coinfabrik
  - Large Public Sector Companies in Blockchain
  - Blockchain hub
    Countries adopting Blockchain Technologies
    Countries forming Blockchain partnership
    Developing Open and Confidential networking

Module 9: Securing Blockchain

- Handling Crypto-mining Malware
- Smart contracts and Secure Computing Network
- Role of Oracles

Module 10: Cryptography and Cryptocurrency

- Digital Currency and Innovation
- Evolution of Cryptocurrencies
- Cryptographic Hash Functions
- Hash Pointers and Data Structures
- What You Should Know about Digital Signatures
- Interaction Between Bitcoin and Altcoins

Module 11: Cryptocurrency Supply Control & Regulation

- Global Cryptocurrency Regulation Updates
- Bitcoin – Controlled Supply
- Cryptocurrency Scalability
- Cryptocurrency Coins & Tokens - Differences
- Quick Guide to Smart Contracts Regulation
- Directed Acyclic Graph (DAG)
- Proof of stake (PoS) & Delegated PoS
- Best Options for Cryptocurrency Storage
- Bitcoin Price & Market Capitalization
- Future of Mass Cryptocurrency Adoption
- Best Cryptocurrency Community
- Core developer team

Module 12: Integrating Cryptocurrency into the System

- Awareness about ICO
- Which Businesses Accept Cryptocurrencies?
- Integrate Cryptocurrency Option into Existing Points of Sale
- Integrating Cryptocurrency Transfer on a Social Network Interface

Module 13: Types of Attacks on Blockchain

- Double Spend Attack
- The 51% Attack

Module 14: Risks & Challenges

- Pump and Dump Groups
- Regulatory Challenges
- Securitization
- Scam Coins

Module 15: Set up Your Own Blockchain

- Creating and Connecting to a Blockchain
- Set Up a Private Blockchain
- Privacy & Permissions in MultiChain
- Mining in MultiChain
- Multiple configurable Blockchains
- Interactive Mode Commands
- Using Native Assets
- Transaction Metadata
- Streams in Multichain

Module 16: Develop Business Networks Using Hyperledger Composer

- Setting up a Development Environment Using Composer
- Test Business Networks
- Introduction to Hyperledger Fabric Model
- Create Hyperledger Fabric Blockchain Network

Module 17: Blockchain and Internet of Things (IoT)

- Blockchain of Things
- Catalyst for Digital Transformation: IoT, AI & Blockchain
- Blockchain – The IoT Saviour!
- Why IoT needs Blockchain?
- Cryptocurrency and IoT

Module 18: Different IoT-Blockchain Services

- Waltonchain
- IBMWatson IoT

Module 19: Future of Blockchain Technology

- Distributed Cloud Storage
- Innovation in Trading Units
- Digital Voting
- Decentralized Notary
- Masterminding IoT Systems

Module 20: Spectrum of Use cases

Market Validation

- Supply Chain
- Vendor Management
- Inventory Management
- Asset Tracking
- Auditing

Finance

- Speeding Up and Simplifying Cross-border Payments
- Smart Assets in the Trade Finance Supply Chain
- The Future of Share Trading
- Smart Contracts
- Improving Online Identity Management

Healthcare

- Claim Settlement
- Clinical Trial Records

Cyber security

- Decentralization
- Tracking & fraud security
- Confidentiality
- Right to be forgotten (about 51% of attacks)
- Network access & Communication
- Data Quality and Monitoring

Digital Marketing Governance

- Fund Allocation
- Fund Tracking
- Public Participation

Module 1

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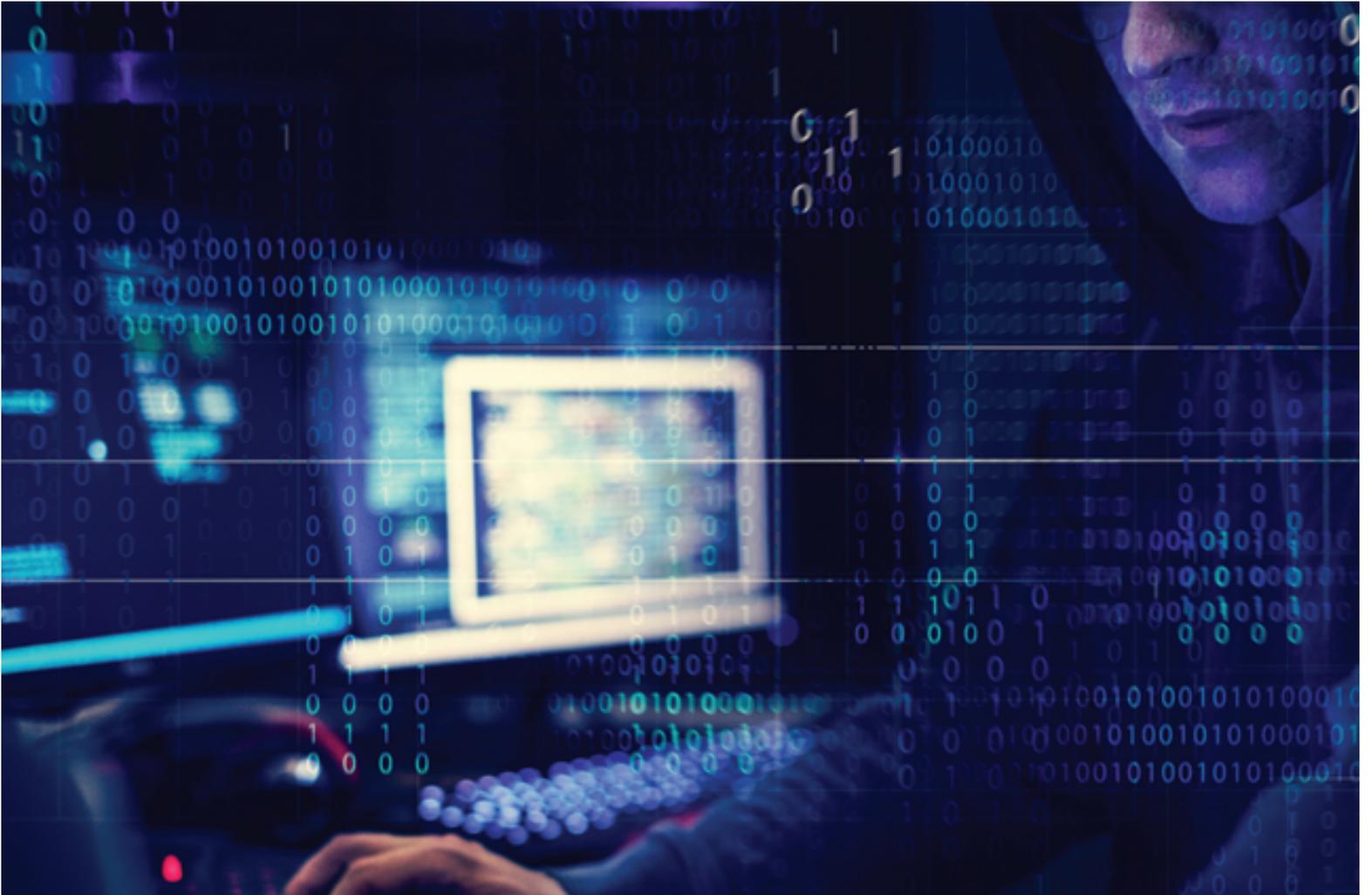# ROCHESTON® CERTIFIED BLOCKCHAIN ENGINEER

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